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Dose-Rate Conversion Factors for External Exposure to Photons and Electrons

D. C. Kocher

Prepared for the
U.S. Nuclear Regulatory Commission
Division of Safeguards, Fuel Cycle, and
Environmental Research
Under Interagency Agreement DOE 40-550-75

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DOSE-RATE CONVERSION FACTORS FOR EXTERNAL EXPOSURE TO PHOTONS AND ELECTRONS

D. C. Kocher

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DOSE-RATE CONVERSION FACTORS FOR EXTERNAL EXPOSURE TO PHOTONS AND ELECTRONS

D. C. Kocher

ABSTRACT

Dose-rate conversion factors for external exposure to photons and electrons have been calculated for approximately 500 radionuclides of potential importance in environmental radiological assessments. The dose-rate factors were obtained using a revised version of the DOSFACTER computer code, which was developed previously to calculate external dose-rate factors for radionuclides of potential importance in the nuclear fuel cycle [D. C. Kocher, Oak Ridge National Laboratory Report, NUREG/CR-0494, ORNL/NUREG/TM-283 (1979); *Health Phys.* 38, 543 (1980)]. The results given in this report incorporate the following modifications and additions to the dose-rate factors published previously: (1) calculation of electron dose-rate factors for radiosensitive tissues of the skin; (2) improved estimates of organ dose-rate factors for photons, based on organ doses for monoenergetic sources at the body surface of an exposed individual calculated by O'Brien and Sanna [*Health Phys.* 30, 76 (1976)] and the spectra of scattered photons in air from monoenergetic sources in an infinite, uniformly contaminated atmospheric cloud calculated by Dillman [*Health Phys.* 27, 571 (1974)]; (3) calculation of dose-rate factors for other radionuclides in addition to those of interest in the nuclear fuel cycle; and (4) incorporation of updated radioactive decay data for all radionuclides. Dose-rate factors are calculated for three exposure modes – immersion in contaminated air, immersion in contaminated water, and exposure at a height of 1 m above a contaminated ground surface. For each exposure mode, the source region is assumed to be effectively semi-infinite or infinite in extent with uniform radionuclide concentration. This report presents the equations used to calculate the external dose-rate factors for photons and electrons, documentation of the revised DOSFACTER computer code, and a complete tabulation of the calculated dose-rate factors. Uncertainties and limitations inherent in the application of the idealized external dose-rate factors to environmental radiological assessments are discussed.

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1. INTRODUCTION

From the point of view of environmental radiological assessments, the central problem in external dosimetry is the estimation of dose to an individual or a population due to exposure to the radiations emitted by radionuclides dispersed in the environment. It is generally quite difficult to obtain realistic estimates of external dose from arbitrary distributions of radionuclides in the environment. Therefore, simplified and idealized exposure conditions are often assumed; namely, that the distribution of sources at any location in the environment is effectively infinite or semi-infinite in extent and the radionuclide concentrations are uniform throughout the source region. In addition, it is often assumed that the only shielding between the radioactive sources and the body surface of the exposed individuals is provided by the medium through which the radiations are transmitted (i.e., air or water). Thus, no accounting is made for shielding provided by buildings during indoor residence, by clothing, or by buildings and irregular terrain during outdoor exposures.

For source regions which are assumed to be infinite or semi-infinite in extent with uniform radionuclide concentration, we are led to the concept of the external dose-rate conversion factor, which will usually be called the dose-rate factor. If a source region has uniform radionuclide concentration χ at time t, the external dose rate $\dot{D}$ for an exposed individual may be written in the general form

$$D(t) = \chi(t) \times DRF \, , \qquad (1)$$

where DRF denotes the dose-rate factor defined by this equation as the external dose-rate per unit radionuclide concentration. The dose-rate factor thus embodies all aspects of the calculation of external dose rate except for the radionuclide concentration, the determination of which is beyond the scope of this work. Rather, our concern here is the determination of the dose-rate factor, which is uniquely specified for a given radionuclide by the particular radiation type, mode of exposure, and body organ of the exposed individual for which the external dose rate is desired. Dose-rate factors are clearly useful in radiological assessments, because multiplication of a dose-rate factor by a radionuclide concentration in the environment gives an external dose rate to an exposed individual. Radionuclide concentrations may be determined, for example, from environmental monitoring or from models for environmental transport.

This report is concerned with the calculation of dose-rate factors for external exposure to photons and electrons emitted by radionuclides dispersed in the environment. The three exposure modes considered are immersion in contaminated air, immersion in contaminated water, and irradiation at a height of 1 m above a smooth ground surface. Again, the source region for each exposure mode is assumed to be effectively infinite or semi-infinite in extent with a uniform radionuclide concentration throughout the source region.

In previous reports,[1,2] external dose-rate factors were calculated for 240 radionuclides of potential importance in routine releases from nuclear fuel cycle facilities, using the DOSFACTER computer code. For each radionuclide and each of the three exposure modes, dose-rate factors for both photons and electrons were calculated for tissue-equivalent material at the body surface of an exposed individual. Dose-rate factors for photons only were calculated for 22 body organs, based on organ doses from monoenergetic sources dispersed uniformly in a semi-infinite atmospheric cloud obtained using Monte Carlo techniques by Poston and Snyder.[3]

This report presents a revised tabulation of external dose-rate factors based on a modified version of the DOSFACTER computer code and an updated compilation of radioactive decay data.[4] These results are intended to supersede those published previously.[1,2] The major modifications of the DOSFACTER code include calculation of electron dose-rate factors for radiosensitive tissues of the skin and incorporation of improved estimates of organ dose-rate factors for photons. External dose-rate factors have been calculated for approximately 500 radionuclides of potential importance in environmental radiological assessments. The radionuclides chosen include those of potential importance in the nuclear fuel cycle considered previously,[1,2] those occurring naturally in the environment, those of current interest in nuclear medicine and fusion reactor technology, and a selection of those of interest to Committee 2 of the International Commission on Radiological Protection (ICRP) for the estimation of annual limits of intake and derived air concentrations for occupationally exposed individuals. This report also provides a summary of the equations used to calculate the photon and electron dose-rate factors for each of the three exposure modes considered and complete documentation for the revised DOSFACTER computer code. Differences between the methods used in the present calculations and those used in the previous reports[1,2] are emphasized. This report also discusses uncertainties and limitations inherent in the application of the external dose-rate factors based on idealized exposure conditions to realistic environmental radiological assessments.

2. DOSE-RATE FACTOR EQUATIONS

In this section, the equations used to calculate dose-rate factors for external exposure to photons and electrons are presented. The dose-rate factors are calculated in units of Sv/yr per Bq/cm^3 for immersion in contaminated air or water and in units of Sv/yr per Bq/cm^2 for exposure to a contaminated ground surface. A quality factor of 1 is assumed for both photons and electrons to convert absorbed dose in Gy to dose-equivalent in Sv.

2.1 Dose Rate from Arbitrary Distributions of Radionuclides

We first consider the general equations for calculating external dose rates from photons and electrons emitted by arbitrary distributions of radionuclides in the environment. The equations for monoenergetic sources are presented and then generalized to the case of photon and electron spectra from radioactive decay.

2.1.1 Dose rate from monoenergetic sources of photons or electrons

The calculation of external dose rates from radioactive sources of photons and electrons dispersed in the environment is based on the concept of the point-isotropic specific absorbed fraction.[5,6] This quantity, denoted by Φ, depends on the radiation type and the medium in which the emitted energy is being transmitted and absorbed, and is defined as follows:

$$\Phi(r,E) = \text{fraction of the emitted energy } E \text{ absorbed per gram of material at a distance } r \text{ from an isotropic point source.} \quad (2)$$

From the definition in Eq. (2), the absorbed dose rate at a distance r from a monoenergetic point source of energy E having activity A at time t is given by[6]

$$\dot{D}(r,E,t) = k \times A(t) \times E \times \Phi(r,E) \ , \quad (3)$$

where

$\dot{D}$ = absorbed dose rate in Gy/s,

$k = 1.6 \times 10^{-10}$ g-Gy/MeV,

A = source activity in Bq,

E = energy of emitted radiation in MeV per decay,

Φ = specific absorbed fraction in g^{-1}.

The value of the constant k is determined by the definition of the gray as one joule of absorbed energy per kilogram and the conversion factor from MeV to joules. The product of k, A, and E gives the total energy emitted per unit time in units of g-Gy/s, and multiplication by Φ gives the energy absorbed per unit mass at distance r.

For the case of a point source imbedded in an infinite absorbing medium of uniform density, all of the emitted energy must be absorbed somewhere within the medium. Therefore, the specific absorbed fraction obeys the important normalization condition

$$4\pi \int_0^\infty \Phi(r,E) r^2 \, dr = 1/\rho \quad , \tag{4}$$

where ρ is the density of the medium. This equation holds for any energy E and any functional form for the specific absorbed fraction, and is strictly a consequence of conservation of energy.

Evaluation of the point-source dose rate in Eq. (3) clearly requires knowledge of the specific absorbed fraction. As we shall discuss in Sect. 2.2.3 and 2.3.4, the specific absorbed fraction for photons can be approximated by an analytical equation; for electrons, however, no such equation has been developed and the specific absorbed fraction is evaluated by interpolation of tabulated values obtained using Monte Carlo techniques.[7,8]

Based on Eq. (3) for a point source, the general equation for the dose rate from an arbitrary distribution of monoenergetic sources is

$$\dot{D}(E,t) = kE \int_\sigma \chi(\vec{r},t)\Phi(r,E) \, d\sigma \quad , \tag{5}$$

where $\vec{r}$ is the vector from the receptor position, assumed to be located at the origin of the coordinate system, to the volume or surface element $d\sigma$ in the source region and $\chi(\vec{r},t)$ is the source concentration at the location defined by $\vec{r}$ at time t in units of Bq per unit volume or area. The integration extends over the source region σ.*

2.1.2 Dose rate from spectra of photons and electrons from radioactive decay

Most radionuclides emit a spectrum of photons and electrons, rather than radiations of a single energy. Therefore, the dose rate for arbitrary source distributions in Eq. (5) must be generalized to account for the spectra characteristic of a particular radionuclide.

---

*In equations involving an integration over a general source region σ, the quantity r denotes $|\vec{r}|$, the length of vector $\vec{r}$.

For photons, we assume that the spectrum consists entirely of discrete γ rays and X rays.* If we define

$f_{i\gamma}$ = intensity of ith photon (γ) in number per decay,
$E_{i\gamma}$ = energy of ith photon in MeV,

then the general equation for the photon dose rate at time t is

$$\begin{aligned} \dot{D}_\gamma(t) &= \sum_i f_{i\gamma}\dot{D}_\gamma(E_{i\gamma},t) \\ &= k \sum_i f_{i\gamma}E_{i\gamma}\int_\sigma \chi(\vec{r},t)\Phi_\gamma(r,E_{i\gamma})\,d\sigma \quad , \end{aligned} \qquad (6)$$

where the dose rate from each emitted photon, $\dot{D}_\gamma(E_{i\gamma},t)$, is given by Eq. (5) and the summation includes all discrete photons in the spectrum of the particular radionuclide.

For electrons, the spectrum may consist in general of discrete Auger and internal conversion electrons from atomic de-excitation processes and continuous electrons from beta decay. The energy distribution for a given beta transition ranges from zero energy to a maximum value called the end-point energy. Thus, we define

---

*Contributions from the continuous spectrum of bremsstrahlung, which is produced when electrons emitted in radioactive decay are slowed down by passage through matter, are not considered in this work. The spectrum of external bremsstrahlung is not characteristic of the particular radionuclide because it results from the interaction of the emitted electrons with the atoms of the material surrounding the radiating atom and, thus, depends on the atomic composition of the surrounding medium. External bremsstrahlung can be of importance in radiation dosimetry, particularly for radionuclides which are pure beta emitters, and methods for calculating the spectrum in materials such as air, muscle, fat, and bone have been implemented by Dillman.[9] Internal bremsstrahlung, on the other hand, occurs as an electron is being ejected from the decaying nucleus itself and, thus, is characteristic of a particular radionuclide. Internal bremsstrahlung, which is also discussed by Dillman,[9] can usually be neglected in radiation dosimetry because of its low intensity and low average energy.

f_{ie} = intensity of ith discrete electron (e) in number per decay,

E_{ie} = energy of ith discrete electron in MeV,

$f_{j\beta}$ = intensity of jth continuous beta transition (β) in number per decay,

$E_{j\beta}^{max}$ = end-point energy in MeV for jth continuous beta transition, and

$N_{j\beta}(E)$ = probability per unit energy for emission of electron of energy E for jth continuous beta transition.

The energy distribution $N_{j\beta}(E)$ for continuous electrons from beta decay obeys the normalization condition

$$\int_0^{E_{j\beta}^{max}} N_{j\beta}(E)\, dE = 1 \tag{7}$$

(i.e., the probability per decay that an electron is emitted with energy between zero and the endpoint energy must be unity). With these definitions, the general equation for the dose rate from electrons (ε) at time t can be written in terms of the separate contributions from the discrete and continuous radiations as

$$\begin{aligned}\dot{D}_\varepsilon(t) &= \sum_i f_{ie}\dot{D}_\varepsilon(E_{ie},t) + \sum_j f_{j\beta}\int_0^{E_{j\beta}^{max}} N_{j\beta}(E)\dot{D}_\varepsilon(E,t)\, dE \\ &= k\sum_i f_{ie}E_{ie}\int_\sigma \chi(\vec{r},t)\Phi_\varepsilon(r,E_{ie})\, d\sigma \\ &\quad + k\sum_j f_{j\beta}\int_0^{E_{j\beta}^{max}} N_{j\beta}(E)\int_\sigma \chi(\vec{r},t)\Phi_\varepsilon(r,E)\, d\sigma\, dE \quad . \end{aligned} \tag{8}$$

Equations (6) and (8) are the fundamental equations describing the external dose rate from arbitrary spatial distributions of radionuclides emitting characteristic photon and electron spectra. In Sect. 2.2 and 2.3, these equations are applied to the special case of uniform distributions of sources of semi-infinite or infinite extent in order to obtain the dose-rate factors for the three exposure modes of interest in accordance with the definition in Eq. (1).

2.2 Dose-Rate Factors for Photons

This section develops the equations used to calculate photon dose-rate factors for a given radionuclide for the different body organs of interest for each of the three exposure modes considered. For a given exposure mode, we first calculate the dose-rate factor in the medium (air or water) surrounding the exposed individual. We then obtain the dose-rate factor for tissue-equivalent material at the body surface. While the body surface does not correspond to a radiosensitive tissue of interest, these dose-rate factors are needed in order to estimate photon organ dose-rate factors for the exposure modes other than immersion in contaminated air. Finally, the desired dose-rate factors for the different body organs are obtained.

In Sects. 2.2.1-2.2.3, the dose-rate factor equations for each exposure mode are developed for monoenergetic sources, based on Eqs. (1) and (5). In Sect. 2.2.4, the dose-rate factor equations are then generalized to the spectrum of photons from radioactive decay, as in Eq. (6).

2.2.1 Dose-rate factors from monoenergetic sources for immersion in contaminated air

Dose-rate factor in air. For exposure via immersion in contaminated air, we assume that the exposed individual is standing at the boundary of a semi-infinite atmospheric cloud with uniform source concentration. Integration of Eq. (5) over the source region using Eq. (4) for the normalization condition for the specific absorbed fraction gives the dose-rate factor in air (a) at the boundary of the atmospheric cloud for emitted energy E_γ as

$$DRF_\gamma^a(E_\gamma) = \frac{1}{2}kE_\gamma/\rho_a \quad . \tag{9}$$

It is known that the factor of 1/2 in Eq. (9), which results from the assumed hemispherical geometry of the source region, is not strictly correct, because the presence of the air-ground interface perturbs the radiation field in air near the ground surface compared with the field in an infinite atmospheric cloud. Dillman[10] has concluded, however, that the dose-rate at the air-ground interface is in fact one-half of the dose rate in an infinite atmospheric cloud within the accuracy of available calculations. Furthermore, although the head of an exposed individual standing on the ground is immersed in a more intense radiation field than the feet, the radiation field incident upon any part of the body is nearly equal to the field at the air-ground interface, provided the photon mean-free-path in air, defined as the reciprocal of the linear attenuation coefficient, is large compared with the height of the exposed individual. Fortunately, the height of an individual standing on the ground corresponds to the mean-free-path in air for a photon energy of only about 10 keV, and the mean-free-path increases rapidly with energy in this energy region.[11] Therefore, for all but the lowest photon energies, it is a good approximation to assume that the radiation field incident upon any part of an exposed individual is one-half of the field in an infinite atmospheric cloud. For energies less than about 10 keV, however, we caution that the dose-rate in air at the height of an average individual may be as much as a factor of 2 greater than the value given by Eq. (9) depending upon the energy, so that the resulting dose-rate factors for body organs near the head may also be underestimated for very low photon energies.

We note here that for a spectrum of photons from radioactive decay, the dose-rate factor in air near the air-ground interface can be written simply as

$$DRF_{\gamma}^{a} = \frac{1}{2}k\bar{E}_{\gamma}/\rho_{a} \quad , \tag{10}$$

where

$$\bar{E}_{\gamma} = \sum_{i} f_{i\gamma}E_{i\gamma} \quad , \tag{11}$$

is the average photon energy per decay. Equation (10) emphasizes that the dose-rate factor in air is determined directly from the principle of conservation of energy (i.e., in an infinite, uniformly contaminated source medium, the energy absorbed per unit volume must be equal to the energy emitted per unit volume everywhere throughout the medium). The form of Eq. (10) is not particularly useful for external dosimetry, however, because the desired organ dose-rate factors depend on the photon spectrum, not the average energy. Similar considerations also hold for the spectra of electrons from radioactive decay.

Dose-rate factor at the body surface. The dose-rate factor for tissue-equivalent material at the body surface of an exposed individual is obtained from the dose-rate factor in air by accounting for two effects. The first is the energy absorption in tissue relative to energy absorption in air for the spectrum of photon energies incident upon the body surface. The second is the shielding of any point on the body surface provided by the body tissues.

For the first effect, energy absorption in tissue relative to air for photons is determined by the ratio of mass energy-absorption coefficients, denoted by μ_{en}/ρ, in the two media. Thus, the tissue-to-air energy-absorption ratio for immersion in contaminated air, denoted by R_{γ}^{a}, can be expressed as

$$R_{\gamma}^{a} = (\mu_{en}/\rho)_{t}/(\mu_{en}/\rho)_{a} \quad , \tag{12}$$

where the subscript t denotes tissue and the ratio is to be evaluated at the energy incident upon the body surface.

In refs. 1 and 2, the body-surface dose-rate factor was calculated by multiplying the dose-rate factor in air given by Eq. (9) by the tissue-to-air energy-absorption ratio defined in Eq. (12) evaluated at the emitted energy E_γ. This is not a rigorous calculation, however, because it does not take into account that the emission of monoenergetic photons in a semi-infinite, uniformly contaminated atmospheric cloud results in a continuous energy distribution of photons between zero energy and the emitted energy at every point in the source region, and it is this continuous spectrum which is incident upon the body surface. For example, the photon spectrum in air for an emitted energy of 0.5 MeV, normalized to a source concentration of 1 μCi/g in an infinite atmospheric cloud, is shown in Fig. 1. Photon spectra for other emitted energies between 0.01 and 4 MeV are given in Figs. 1-4 of ref. 10.* Thus, in a proper calculation of the tissue-to-air energy absorption ratio, the ratio in Eq. (12) must be averaged over the continuous energy spectrum of photons in air resulting from scattering of the photons of the given emitted energy. Therefore, if we define

$\bar{R}^a_\gamma(E_\gamma)$ = ratio of mass energy-absorption coefficients in tissue and air averaged over the spectrum of photons in an infinite, uniformly contaminated atmospheric cloud for emitted energy E_γ , (13)

the dose-rate factor at the body surface (s) accounting for energy absorption in tissue relative to air is given by

$$DRF^s_\gamma(E_\gamma) = \frac{1}{2}kE_\gamma\bar{R}^a_\gamma(E_\gamma)/\rho_a \quad . \tag{14}$$

The ratio $\bar{R}^a_\gamma$ as a function of emitted photon energy has been calculated by Dillman,^{10} and the results obtained from Fig. 6 of ref. 10

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*The area under the curves (i.e., the number of photons per unit area per unit time) is proportional to the assumed source concentration in air, but the shape of the spectrum for a given emitted energy is independent of the concentration.

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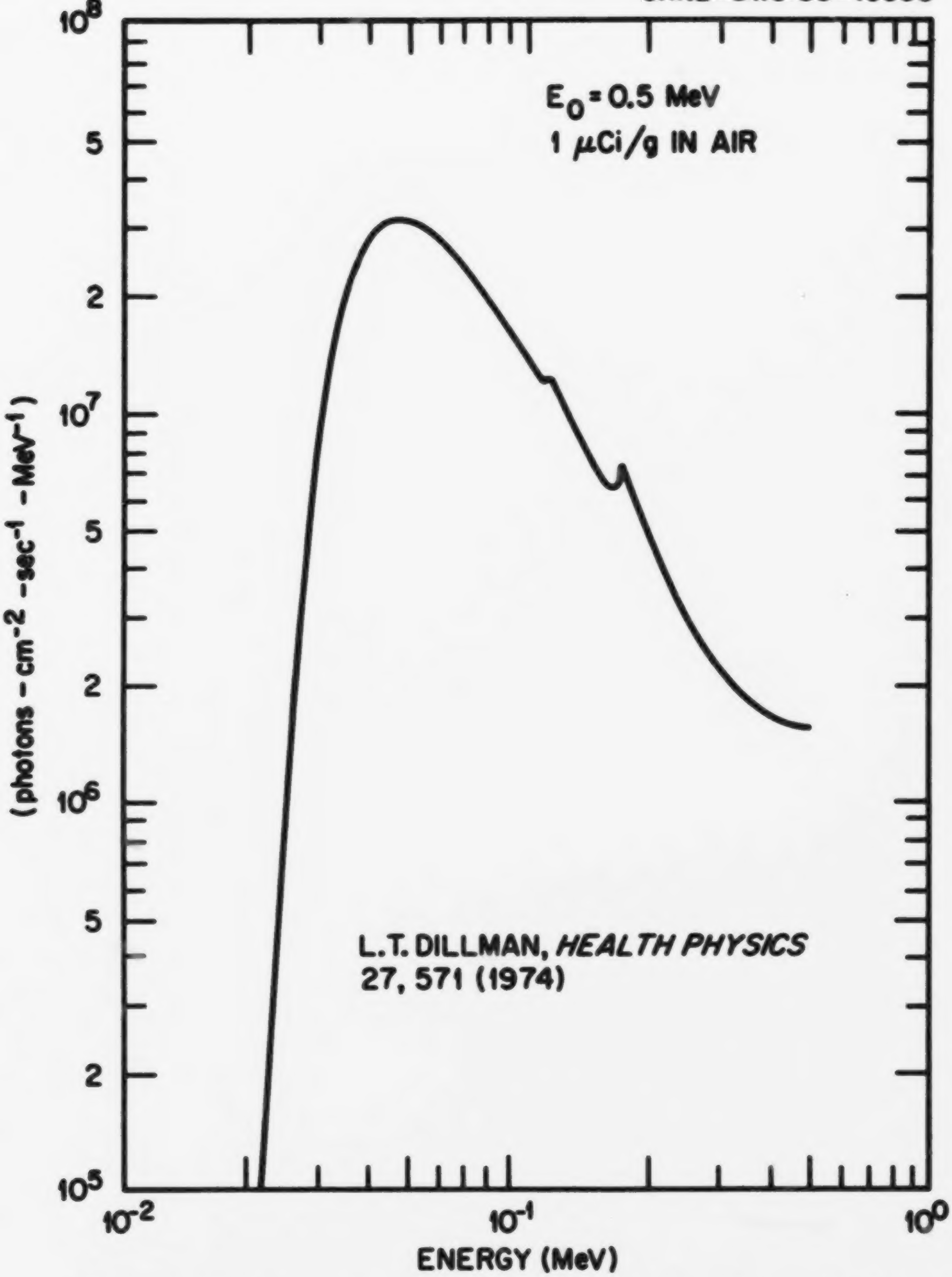

Fig. 1. Spectrum of photons in air resulting from emission of monoenergetic photons of energy 0.5 MeV in an infinite, uniformly contaminated atmospheric cloud with source intensity of 1 μCi/g.

are compared with the ratio in Eq. (12) evaluated at the emitted energy, used previously in refs. 1 and 2, in Fig. 2. The formulation used here is seen to give body-surface dose-rate factors which are about 10% less at 10 keV emitted energy, with the difference decreasing to less than 3% for energies above 0.2 MeV. Such differences are probably not significant for most applications in environmental dosimetry, but the energy-averaged method used in this report is preferred on theoretical grounds.

With regard to the effect of shielding by body tissues on the dose-rate factor at the body surface, we make the customary and conservative assumption that the body tissues provide no shielding for photons, so that the body surface is irradiated equally from all directions whether or not the incident photons must traverse body tissues. This is obviously a poor assumption for energies in the X-ray region. If we assume that body tissues effectively shield any point on the surface from half of the source region, then, in actuality, body shielding reduces the dose rate at the body surface by a factor between 1/2 and 1, depending upon the photon energy. We note that the error in Eq. (14) from assuming no shielding by body tissues will be of no consequence in calculating dose-rate factors for body organs, because the organ dose-rate factors described below properly account for body shielding effects.

Although the body surface is not a radiosensitive tissue of interest, the dose-rate factor in Eq. (14) is used in Sects. 2.2.2 and 2.2.3 to estimate organ dose-rate factors for water immersion and ground-surface exposure.

Dose-rate factors for body organs. For immersion in contaminated air, the dose-rate factors for the different body organs as a function of emitted photon energy are obtained directly from available calculations, which are based on Monte Carlo simulations of photon transport through the tissues of the so-called Reference Man.[12] In this work, we express the available results not in terms of the dose-rate factor itself (i.e., the organ dose rates per unit concentration of monoenergetic sources uniformly distributed in a semi-infinite atmospheric

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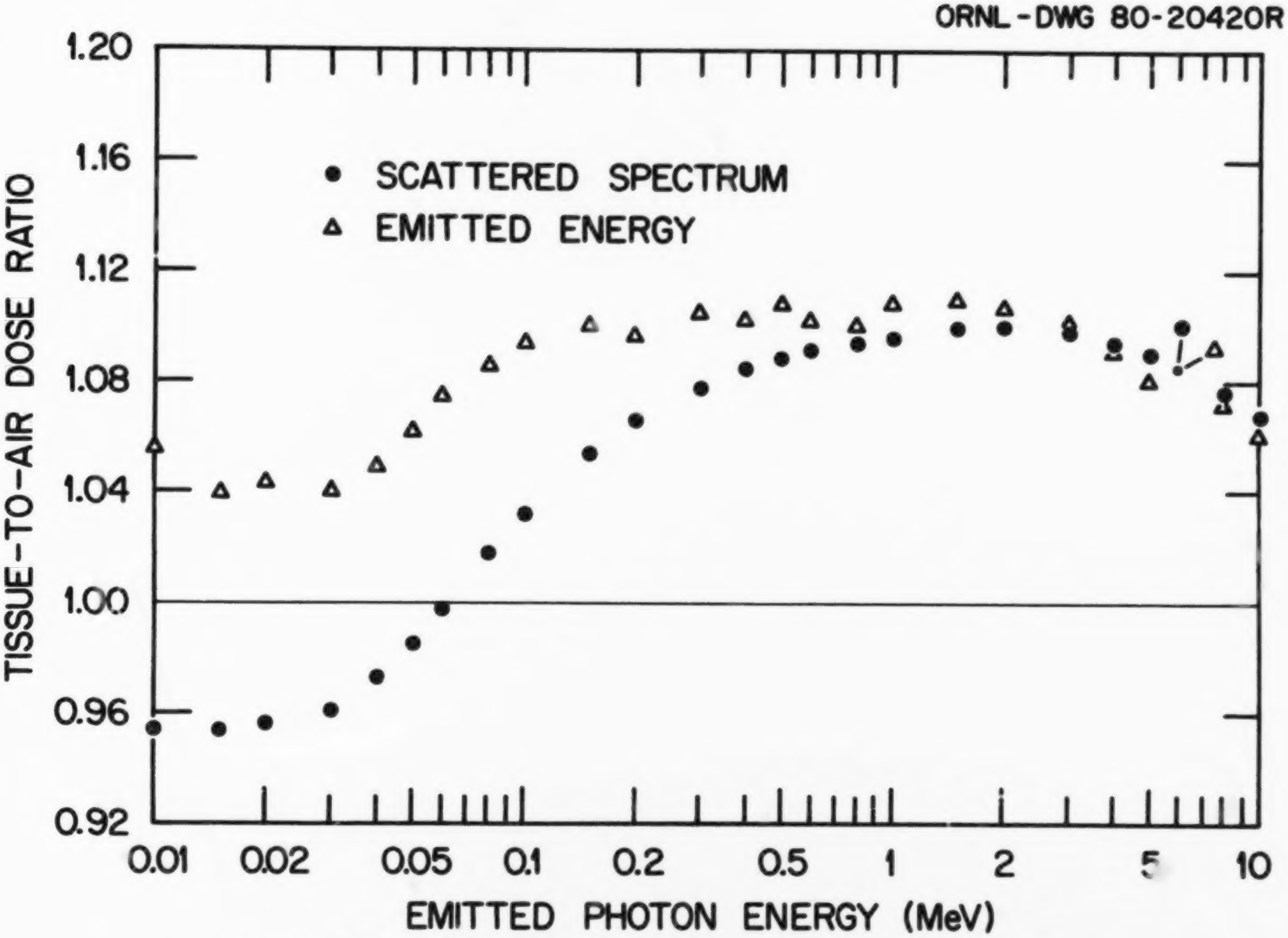

Fig. 2. Ratio of dose in tissue to dose in air for tissue immersed in an infinite, uniformly contaminated atmospheric cloud vs emitted photon energy. The solid symbols from ref. 10 give the dose ratio averaged over the scattered photon spectrum in air. The triangles give the ratio evaluated at the emitted energy from ref. 11.

cloud) but, rather, as the ratio of organ dose rate to the dose rate in air. Thus, we define the quantity $G^k(E_\gamma)$ as

$$G^k(E_\gamma) = \text{ratio of dose rate in body organ } k \text{ to dose rate in air for emitted energy } E_\gamma \,. \tag{15}$$

With this definition and the dose-rate factor in air given by Eq. (9), the dose-rate factor for organ k is given by

$$DRF^k_\gamma(E_\gamma) = \tfrac{1}{2}kE_\gamma G^k(E_\gamma)/\rho_a \tag{16}$$

The definition of the ratio $G^k(E_\gamma)$ given in Eq. (15) differs slightly from the definition used previously in refs. 1 and 2. In the earlier work, this quantity was defined as the ratio of organ dose rate to dose rate at the body surface. Thus, the two definitions are related by the tissue-to-air energy-absorption ratio defined in Eq. (13). The ratio G^k is redefined here for no other reason than to conform to the format in which the organ dose-rate factors used in this work are presented.[13]

The rationale for expressing the organ dose-rate factors in Eq. (16) in terms of the quantity G^k defined in Eq. (15) when the desired dose-rate factors are directly available from the literature is that the results for immersion in contaminated air do not apply to exposure via immersion in contaminated water or irradiation from a contaminated ground surface, and organ dose-rate factors are not available in the literature for the latter two exposure modes. In this work, organ dose-rate factors for exposure modes other than air immersion are based on the assumption that the ratio of organ dose rate to dose rate at the body surface is independent of the mode of exposure. Thus, the definition in Eq. (15) combined with that in Eq. (13) is necessary for obtaining organ dose-rate factors for the other exposure modes.

The organ dose-rate factors for immersion in contaminated air adopted in refs. 1 and 2 were those calculated by Poston and Snyder.[3] The calculations in ref. 3 have the disadvantage, however, that results were obtained only for emitted photon energies of 4 MeV and below, and the statistical accuracy of the results tends to be relatively poor, particularly for small, deep lying organs. Therefore, in this report, a different set of photon organ dose-rate factors has been used.

The organ dose-rate factors for immersion in contaminated air used in this report were obtained by Kerr and Eckerman.[13] These results are based on the Monte Carlo simulations of O'Brien and Sanna,[14,15] giving organ doses per photon per unit area from monoenergetic sources isotropically irradiating the body surface, combined with the energy spectra of scattered photons in air resulting from monoenergetic sources in an infinite, uniformly contaminated atmospheric cloud calculated by Dillman.[10] That is, the dose-rate factors for monoenergetic sources in air were obtained by Kerr and Eckerman[13] by integrating the doses per field fluence photon at the body surface over the energy spectrum of scattered photons in air.

Dose-rate factors for selected body organs calculated by Kerr and Eckerman[13] for immersion in contaminated air are compared with the results of Poston and Snyder[3] in Figs. 3-5. The organ dose-rate factors have been normalized to the dose-rate factor in air for each emitted energy [i.e., the quantity shown is the ratio $G^k(E_\gamma)$ defined in Eq. (15)]. One obvious advantage of the newer calculations is that they extend to 10 MeV emitted energy.

The results for total body in Fig. 3 illustrate that the organ dose-rate factors of Kerr and Eckerman are generally less than those of Poston and Snyder for the same emitted energy. For total body, the difference ranges from 16 to 45% above 15 keV. Even for skin, which is the radiosensitive organ lying closest to the body surface, the dose-rate factors of Kerr and Eckerman are consistently less than the values of Poston and Snyder, the largest difference being 35% at 15 keV with smaller differences at higher energies. The source of the systematic discrepancy between the two sets of calculations is not known. The mathematical representation of the irradiated individual is presumably not the cause, however, because for most body organs the same model for Reference Man[12] is used in both sets of calculations.

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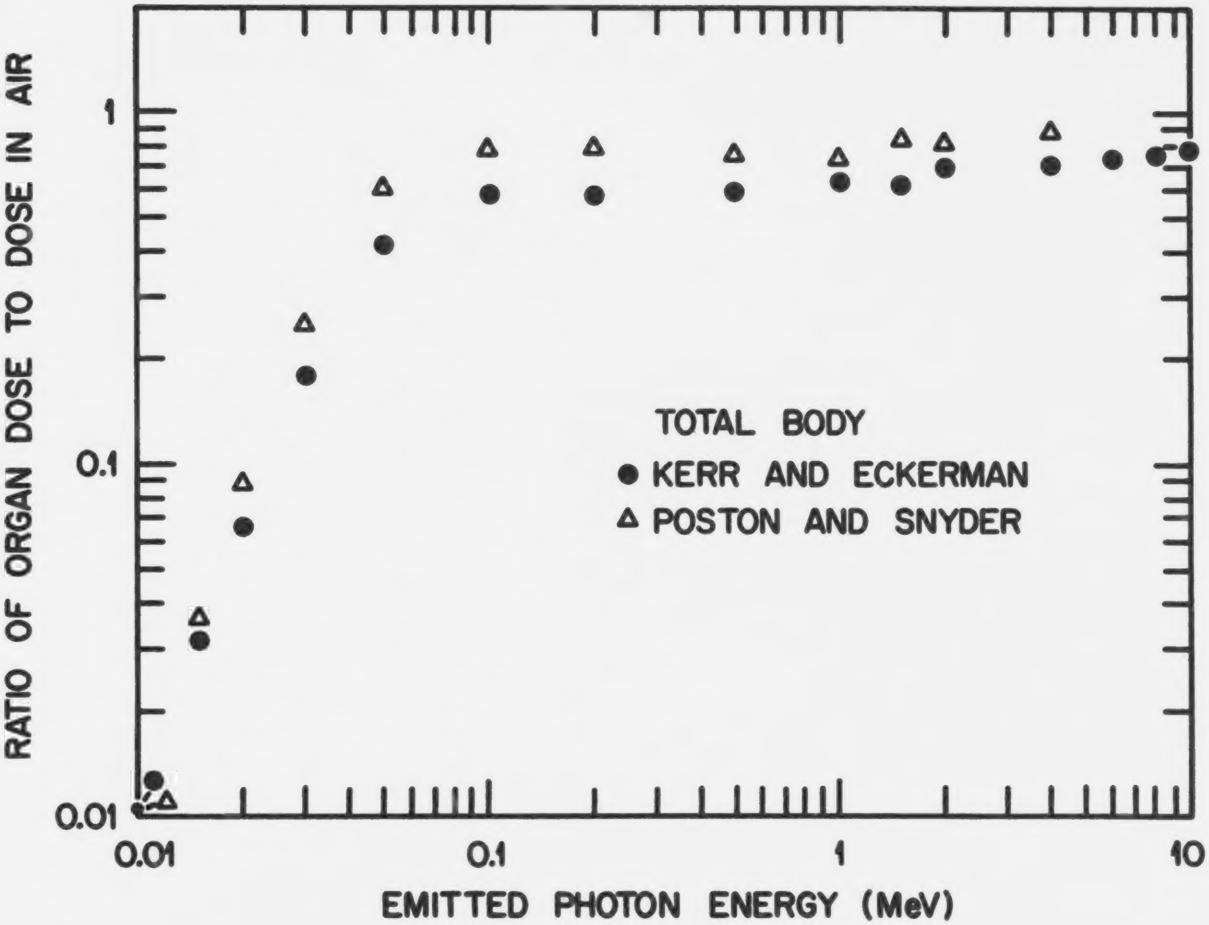

Fig. 3. Ratios of dose to total body to dose in air for an infinite, uniformly contaminated atmospheric cloud vs emitted photon energy. The results of Kerr and Eckerman[13] are used in the present work, whereas those of Poston and Snyder[3] were used previously in refs. 1 and 2.

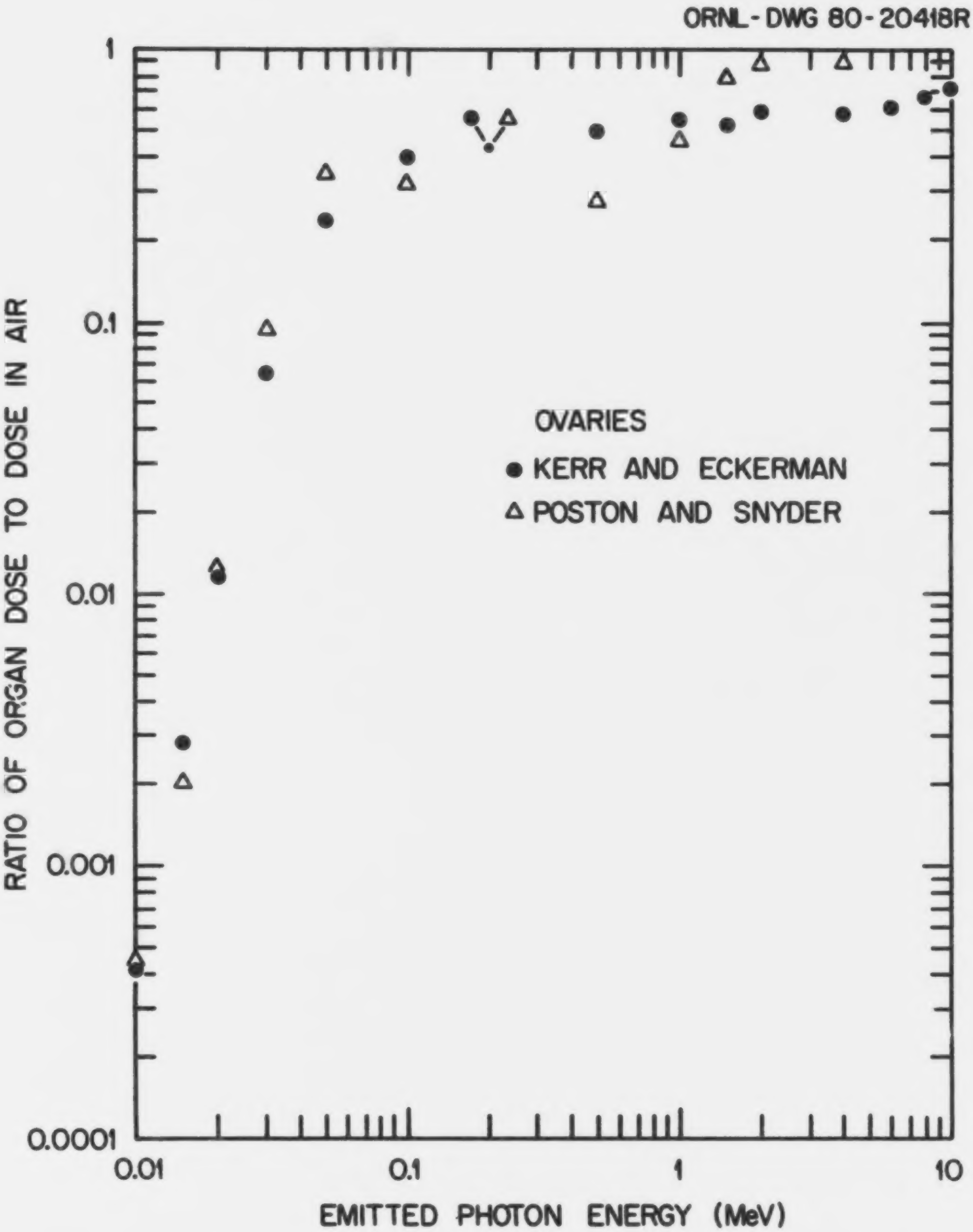

Fig. 4. Ratios of dose to the ovaries to dose in air for an infinite, uniformly contaminated atmospheric cloud vs emitted photon energy. The results of Kerr and Eckerman[13] are used in the present work, whereas those of Poston and Snyder[3] were used previously in refs. 1 and 2.

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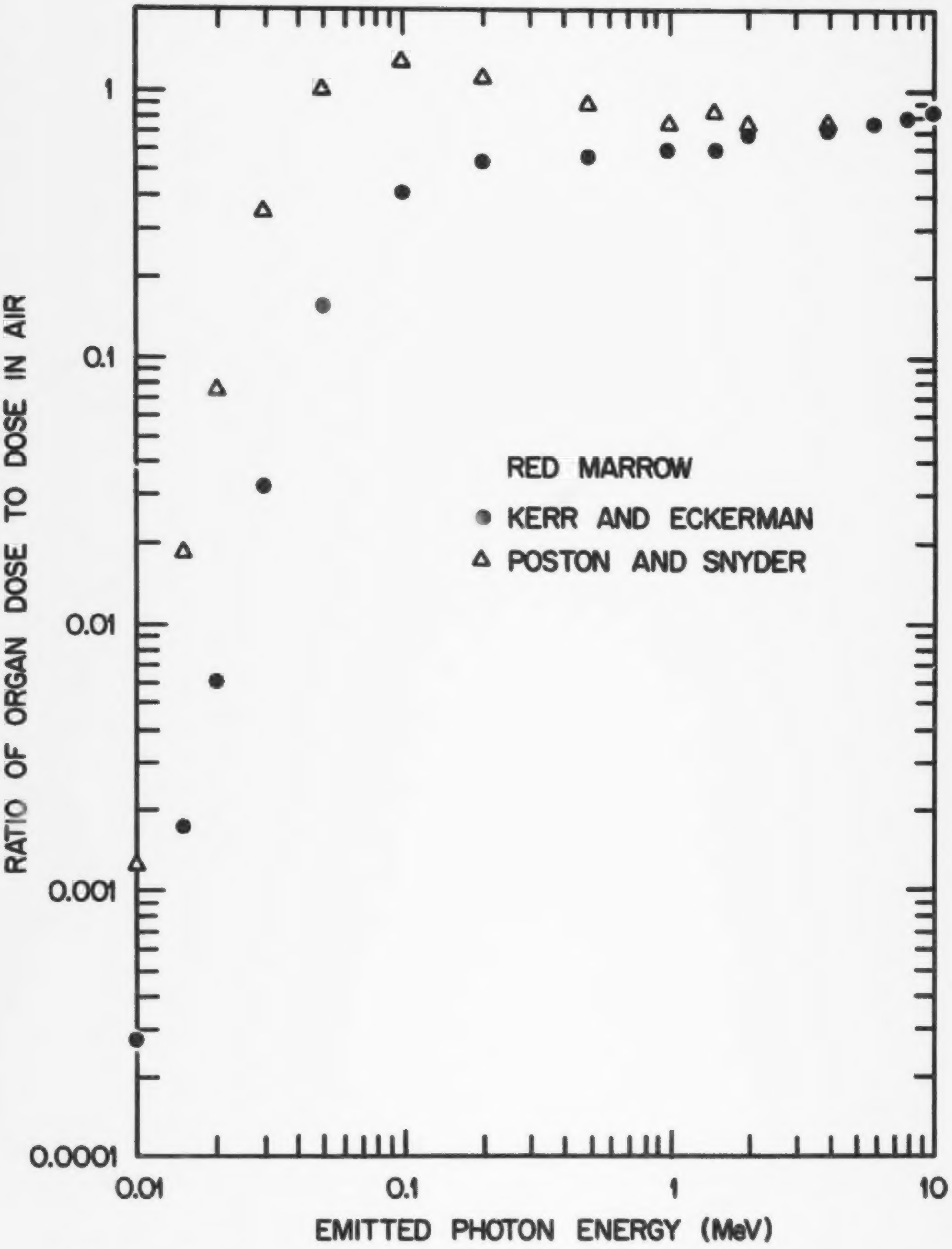

Fig. 5. Ratios of dose to red bone marrow to dose in air for an infinite, uniformly contaminated atmospheric cloud vs emitted photon energy. The results of Kerr and Eckerman[13] are used in the present work, whereas those of Poston and Snyder[3] were used previously in refs. 1 and 2.

The dose-rate factors for the ovaries in Fig. 4 illustrate that for small, deep lying organs, the results of Poston and Snyder show an unreasonable scatter with energy, due primarily to the poor statistical accuracy of the calculations. The observed scatter not only casts doubt on the validity of the results but also makes reliable interpolations quite difficult. The improved statistical accuracy of the Kerr and Eckerman calculations, on the other hand, results in a much smoother energy dependence for the dose-rate factors.

The comparison of dose-rate factors for red bone marrow in Fig. 5 is of particular interest because this organ is one of the most radiosensitive in the body. The dose-rate factors of Kerr and Eckerman are again consistently less than those of Poston and Snyder, but the difference is much more pronounced below 0.5 MeV than for other organs and exceeds a factor of 10 for some energies below 50 keV. For this organ, however, a significant part of the difference in the two calculations results from the different approximations used to describe the distribution of red marrow in Reference Man. The calculations of Poston and Snyder assume that the skeleton is a homogeneous mixture of bone and bone marrow. This approximation does not properly take into account the shielding of bone marrow provided by bone. Kerr and Eckerman, on the other hand, assume that the bone marrow is located in the trabecular bone cavities of the skeleton and apply an energy-dependent correction factor to the bone marrow dose-rate factor which accounts for shielding of the marrow by bone. This correction factor, which is described by Kerr,[16] results in a significant reduction in bone marrow dose for energies below 0.2 MeV.

In this report, the organ dose-rate factors calculated using Eq. (16) assume a density for air of 1.189×10^{-3} g/cm^3, which is the value appropriate for dry air at 20°C and 750 mm atmospheric pressure, rather than the customary value of 1.293×10^{-3} g/cm^3 appropriate for standard temperature and pressure. Therefore, the organ dose-rate factors given here are about 9% larger than the values calculated by Kerr and Eckerman for the same emitted photon energy and the same source concentration in air, due to the different density of air assumed.

2.2.2 Dose-rate factors from monoenergetic sources for immersion in contaminated water

Dose-rate factor in water. For immersion in contaminated water, we assume that the exposed individual is totally immersed in an infinite water medium with uniform radionuclide concentration. Therefore, from Eqs. (4) and (5), the dose-rate factor in water (w) for emitted energy E_γ is given by

$$DRF_\gamma^w(E_\gamma) = kE_\gamma/\rho_w \quad . \tag{17}$$

If the exposed individual is totally immersed in the contaminated water, the assumption that the exposure medium is infinite in extent is a reasonable one, because the photon mean-free-path in water is only 45 cm at 10 MeV and decreases with decreasing energy.[11] However, since the head is normally not submerged for the same length of time as the rest of the body, the resulting dose-rate factors for body organs near the head may be overestimated.

Dose-rate factor at the body surface. By analogy with Eqs. (13) and (14) for immersion in contaminated air, the dose-rate factor at the body surface for immersion in contaminated water should be obtained, in principle, by accounting for the energy absorption in tissue relative to water averaged over the spectrum of photon energies in water incident upon the body surface. We note, however, that energy absorption in tissue and water are very nearly the same at all photon energies. Therefore, we define R_γ^w in analogy with Eq. (12) as

$$R_\gamma^w = (\mu_{en}/\rho)_t/(\mu_{en}/\rho)_w \quad , \tag{18}$$

where the ratio is evaluated at the emitted energy E_γ, and calculate the dose-rate factor at the body surface as

$$DRF_\gamma^s(E_\gamma) = kE_\gamma R_\gamma^w(E_\gamma)/\rho_w \quad . \tag{19}$$

If the spectra of photons in contaminated water and air are assumed to be the same for a given emitted energy, the approximation for the tissue-to-water energy-absorption ratio used in Eq. (19) is in error by less than 2% at all energies between 10 keV and 10 MeV. The scattered photon spectra should not be significantly different in air and water, because of the similar average atomic numbers for the two media.

Dose-rate factors for body organs. Monte Carlo calculations of organ dose-rate factors have not been performed for immersion in contaminated water. In this work, we assume that the ratio of organ dose rate to dose rate at the body surface is the same for water immersion and immersion in contaminated air. Therefore, the organ dose-rate factors for immersion in contaminated water are calculated from Eqs. (14), (16), and (19) as

$$DRF_{\gamma}^{k}(E_{\gamma}) = kE_{\gamma}R_{\gamma}^{w}(E_{\gamma})G^{k}(E_{\gamma})/\bar{R}_{\gamma}^{a}(E_{\gamma})\rho_{w} \quad , \qquad (20)$$

where $G^{k}(E_{\gamma})$ is the ratio of dose rate in body organ k to the dose rate in air and $\bar{R}_{\gamma}^{a}$ is defined in Eq. (13) as the tissue-to-air energy-absorption ratio for immersion in contaminated air.

Equation (20) should be a reasonable approximation to the correct organ dose-rate factors for immersion in contaminated water, because the scattered spectra of photons at the body surface for water immersion and air immersion should not be significantly different and it is reasonable to assume that the radiation field is isotropic in both cases.

2.2.3 Dose-rate factors from monoenergetic sources for exposure to a contaminated ground surface

Dose-rate factor in air. Derivation of the equations for the dose-rate factors in air or water in Sects. 2.2.1 and 2.2.2 above was particularly simple, because the source region coincides with the exposure medium and the radiation field is the same throughout the source region. Therefore, the dose-rate factors could be calculated using the principle of conservation of energy without explicit knowledge of the specific absorbed fraction for photons in air or water. For exposure to a contaminated ground surface, however, the radiation field in air above ground is not independent of height above the surface. Therefore, the dose-rate factor in air above ground must be obtained by solving Eq. (5) for the dose rate at a given location from the assumed distribution of sources on the ground surface, using the known specific absorbed fraction for photons in air.

The source region is assumed to be a smooth infinite plane with uniform source concentration. From Eqs. (1) and (5), the dose-rate factor in air at a height z above ground for photon energy E_γ is given by

$$DRF_\gamma^a(z,E_\gamma) = kE_\gamma \int_\sigma \Phi_\gamma^a(r,E_\gamma)\, d\sigma \quad , \qquad (21)$$

where r is the distance from any point on the ground to the receptor position in air and σ denotes the ground surface.

For photons, the specific absorbed fraction in air is given by[6]

$$\Phi_\gamma^a(r,E_\gamma) = \frac{1}{4\pi r^2} (\mu_{en}/\rho)_a \, B_{en}^a(\mu_a r) \exp(-\mu_a r) \quad , \qquad (22)$$

where

$(\mu_{en}/\rho)_a$ = mass energy-absorption coefficient in air in cm^2/g,
B_{en}^a = energy-absorption buildup factor in air,
μ_a = linear attenuation coefficient in air in cm^{-1}

The quantities $(\mu_{en}/\rho)_a$, B_{en}^a, and μ_a are functions of the photon energy and are evaluated at the emitted energy E_γ. The term $1/4\pi r^2$ describes the geometrical reduction of the radiation field with distance from a point source, $\exp(-\mu_a r)$ describes the reduction in the number of photons reaching the receptor position due to single scattering events in air, and $(\mu_{en}/\rho)_a$ describes energy absorption at the receptor position for the unscattered photons. The buildup factor, which is a function of the dimensionless quantity $\mu_a r$, accounts for the number of scattered photons which eventually reach the receptor position due to secondary scattering events and for the dependence of the mass energy-absorption coefficient on the energy of the scattered photons. The buildup factor is dimensionless and has a value greater than unity.

The element of surface area, $d\sigma$, on the ground surface is given by

$$d\sigma = 2\pi r\, dr \quad . \tag{23}$$

Therefore, the dose-rate factor in air becomes

$$DRF_\gamma^a(z,E_\gamma) = \frac{1}{2}kE_\gamma(\mu_{en}/\rho)_a \int_z^\infty \frac{1}{r}\, B_{en}^a(\mu_a r)\, \exp(-\mu_a r)\, dr \quad , \tag{24}$$

where z is the height above the ground surface in cm.

Various analytical approximations for the buildup factor have been developed.[17] An approximation which often leads to easily integrable equations and yields good numerical accuracy is the Berger form of the buildup factor,[17] given by

$$B_{en}^a(\mu_a r) = 1 + C_a \mu_a r\, \exp(D_a \mu_a r) \quad , \tag{25}$$

where the coefficients C_a and D_a are functions of the emitted photon energy and D_a must be less than one. These coefficients are obtained from linear least-squares fits of Eq. (25) to published buildup factors in air.

Evaluation of Eq. (24) using the buildup factor in Eq. (25) gives the dose-rate factor in air as

$$DRF_\gamma^a(z,E_\gamma) = \frac{1}{2}kE_\gamma(\mu_{en}/\rho)_a \left\{ \tilde{E}_1(\mu_a z) - \frac{C_a}{(D_a - 1)} \exp[(D_a - 1)\mu_a z] \right\} , \tag{26}$$

where $\tilde{E}_1(\mu_a z)$ is the well known first-order exponential integral

$$\tilde{E}_1(\mu_a z) = \int_z^\infty \frac{1}{r} \exp(-\mu_a r)\, dr \quad . \tag{27}$$

The dose-rate factor in air varies with the height z above ground. In this work, the dose-rate factors are based on an evaluation of Eq. (26) for the single height $z = 1$ m, a distance which corresponds to the average height of the body surface for an exposed individual standing on the ground.

Dose-rate factor at the body surface. By analogy with Eqs. (13) and (14) for immersion in contaminated air, we calculate the dose-rate factor at the body surface for a height z above a contaminated ground surface from Eqs. (13) and (26) as

$$DRF_\gamma^s(z,E_\gamma) = \frac{1}{2}kE_\gamma(\mu_{en}/\rho)_a\ \bar{R}_\gamma^a(E_\gamma) \left\{ \tilde{E}_1(\mu_a z) - \frac{C_a}{(D_a-1)} \exp[(D_a-1)\mu_a z] \right\}. \tag{28}$$

This equation is obtained by correcting the dose-rate factor in air for the tissue-to-air energy-absorption ratio $\bar{R}_\gamma^a$.

In a proper calculation, the tissue-to-air energy absorption ratio $\bar{R}_\gamma^a$ in Eq. (28) should be evaluated according to the definition in Eq. (13) using the scattered photon spectrum in air at the height z above the ground surface, rather than the scattered spectrum in air from an infinite atmospheric cloud source. However, extensive calculations of scattered photon spectra in air above a contaminated ground surface and of the quantity $\bar{R}_\gamma^a$ for these spectra are not available in the literature.* Therefore, we assume that the quantity $\bar{R}_\gamma^a$ in Eq. (28) is independent of the height above ground and is given by the values for an infinite atmospheric cloud source shown in Fig. 2. We note that the error in this assumption cannot be more than a few percent, because the tissue-to-air energy absorption ratio is not strongly dependent upon photon energy (e.g., see Fig. 2).

Dose-rate factors for body organs. As with immersion in contaminated water, Monte Carlo calculations of organ dose-rate factors have not been performed for exposure to a contaminated ground surface. We again assume that the ratio of organ dose rate to dose rate at the body surface is the same for ground-surface exposure and immersion in contaminated air. Since air is the medium surrounding the exposed individual for both air immersion and ground-surface exposure, this is equivalent to assuming that the ratio of organ dose rate to dose rate in air is the same for both exposure modes. Therefore, the dose-rate factor for organ k is calculated from Eqs. (9), (16), and (26) as

$$DRF_\gamma^k(z,E_\gamma) = \frac{1}{2}kE_\gamma(\mu_{en}/\rho)_a \; G^k(E_\gamma)\left\{ \tilde{E}_1(\mu_a z) - \frac{C_a}{(D_a-1)} \exp[(D_a-1)\mu_a z] \right\}, \tag{29}$$

where $G^k(E_\gamma)$ is defined in Eq. (15).

It is important to recognize that the assumption used to calculate organ dose-rate factors for ground-surface exposure in Eq. (29) may lead to results which are significantly in error. The calculations are based on the dose-rate factor in air at the single height $z = 1$ m above ground, and, more importantly, application of the ratio $G^k(E_\gamma)$ for immersion in contaminated air involves the implicit assumptions that the radiation field above ground is isotropic and independent of height and that the energy spectrum of scattered photons at any height above ground is the same as the spectrum of scattered photons in an infinite atmospheric cloud source.

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*The energy spectrum for a ^{137}Cs ($E_\gamma = 0.662$ MeV) source calculated by Beck and de Planque[18] indicates that the scattered spectrum at a height of 1 m above a contaminated ground surface is weighted more heavily toward higher energies than the corresponding spectrum from an infinite atmospheric cloud source, such as shown in Fig. 1.

The assumption most clearly violated is that the radiation field in air above a contaminated ground surface is isotropic. The angular distributions for two different photon energies at a height of 1 m calculated by Beck and de Planque[18] are shown in Fig. 6.* The radiation field is clearly quite anisotropic, with most of the photons coming from just below the direction of the horizontal and very few coming from above the horizontal. The effect that the strongly anisotropic angular distributions at the body surface would have on the resultant organ dose-rate factors, however, is not known.

The different energy spectra of scattered photons in air above a contaminated ground surface compared with the scattered spectra from an infinite atmospheric cloud source undoubtedly have some effect on the resultant organ dose-rate factors. If, as indicated by the calculations of Beck and de Planque,[18] the energy spectra from a ground surface are weighted more toward higher energies, use of the ratio $G^k(E_\gamma)$ for immersion in contaminated air in Eq. (29) probably underestimates the organ dose-rate factors for ground-surface exposure. We have no indication, however, of the magnitude of possible errors.

Calculation of organ dose-rate factors based on the dose-rate factor in air at the single height of 1 m, rather than averaging over a distance of 2 m above ground, probably does not result in serious errors unless the photon mean-free-path in air is about 2 m or less, which occurs only for the lowest energies.[11] At these energies, the dose-rate factors for organs near the head could be significantly overestimated. For all but the lowest energies, however, both the angular distribution and the energy spectrum of scattered photons should not vary significantly with height above ground over a distance of 2 m, so that the dose-rate factor in air at a height of 1 m should adequately approximate the values averaged over a height of 2 m.

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*The apparent discontinuity at 90°, the direction of the horizontal, is not real and is due to the vertical scale used in ref. 18.

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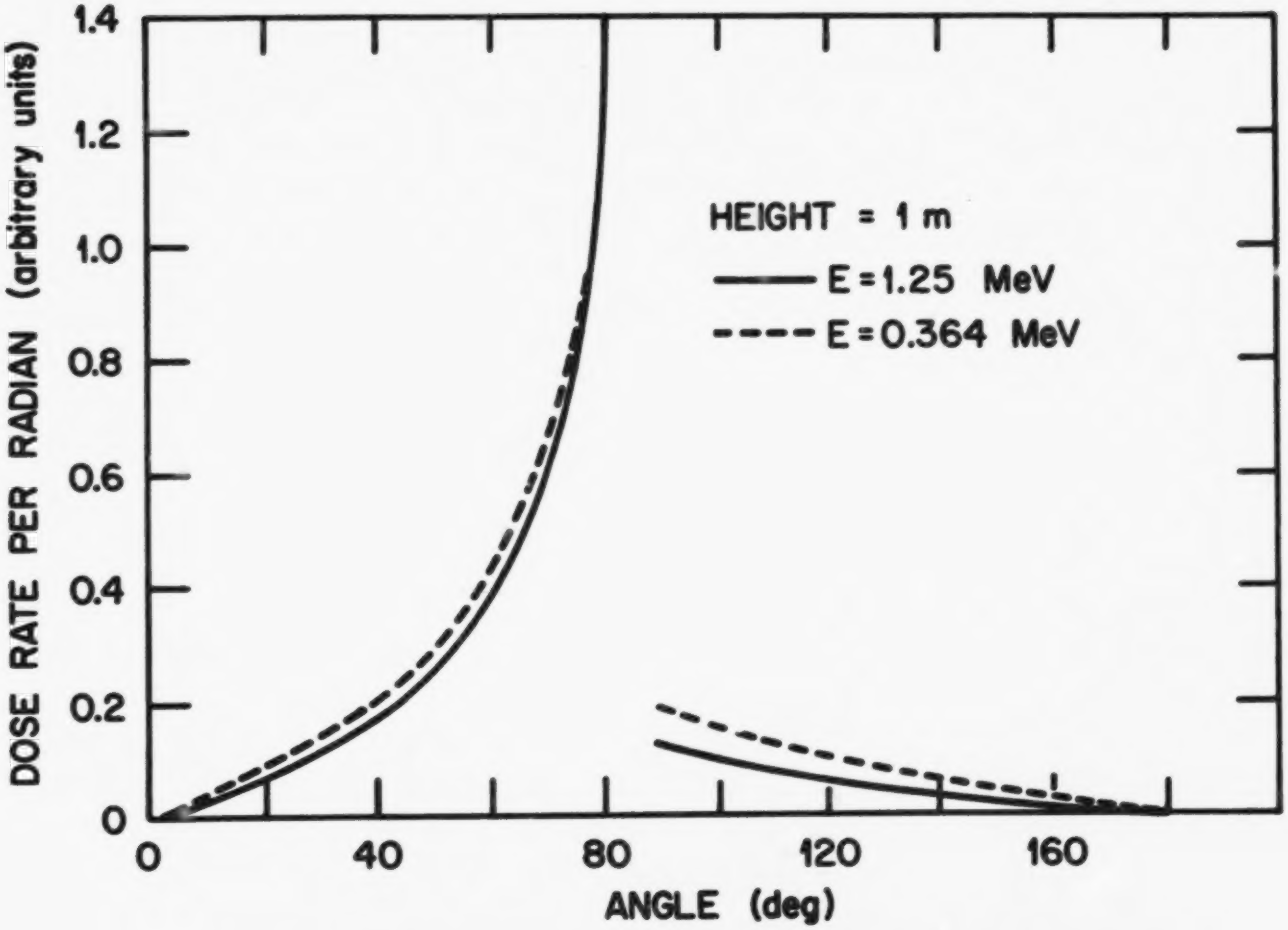

Fig. 6. Angular distribution of the radiation field at a height of 1 m above a smooth, infinite, and uniformly contaminated ground surface for two different emitted photon energies calculated by Beck and de Planque.[18] An angle of 0° corresponds to the vertically downward direction.

In principle, a proper calculation of organ dose-rate factors for exposure to a contaminated ground surface would account for the variations of the angular and energy distributions of the radiation field at the body surface with height above ground. Such a calculation is very difficult and has not been performed. A further complicating factor is that the exposed individual does not normally maintain a constant vertical orientation relative to the ground surface. Accounting for changes in orientation, however, would probably serve to make the calculations using Eq. (29) more accurate, because it is then reasonable that the radiation field at the body surface averaged over time is more nearly isotropic than for a constant vertical orientation.[14,15]

2.2.4 Dose-rate factors for photon spectra from radioactive decay

In this section, the dose-rate factor equations developed for sources of monoenergetic photons for each of the three exposure modes are generalized to give the dose-rate factor equations for the spectra of photons resulting from the decay of a particular radionuclide. The generalization is based on Eq. (6) (i.e., the dose-rate factor for each photon energy in the decay is weighted by its intensity and the results are summed over all discrete photons in the spectrum).

Immersion in contaminated air. From Eqs. (9), (14), and (16), the dose-rate factors for immersion in contaminated air from the spectrum of photons in radioactive decay are as follows:

Dose-rate factor in air (a) -

$$\begin{aligned} DRF_\gamma^a &= \sum_i f_{i\gamma} DRF_\gamma^a(E_{i\gamma}) \\ &= \tfrac{1}{2} k/\rho_a \sum_i f_{i\gamma} E_{i\gamma} \qquad (30) \end{aligned}$$

Dose-rate factor at body surface (s) -

$$DRF_{\gamma}^{s} = \sum_{i} f_{i\gamma} DRF_{\gamma}^{s}(E_{i\gamma})$$

$$= \frac{1}{2} k/\rho_a \sum_{i} f_{i\gamma} E_{i\gamma} \bar{R}_{\gamma}^{a}(E_{i\gamma}) \qquad (31)$$

Dose-rate factor for body organ k -

$$DRF_{\gamma}^{k} = \sum_{i} f_{i\gamma} DRF_{\gamma}^{k}(E_{i\gamma})$$

$$= \frac{1}{2} k/\rho_a \sum_{i} f_{i\gamma} E_{i\gamma} G^{k}(E_{i\gamma}) \qquad (32)$$

Immersion in contaminated water. From Eqs. (17), (19), and (20), the dose-rate factors for immersion in contaminated water from the spectrum of photons in radioactive decay are as follows:

Dose-rate factor in water (w) -

$$DRF_{\gamma}^{w} = \sum_{i} f_{i\gamma} DRF_{\gamma}^{w}(E_{i\gamma})$$

$$= k/\rho_w \sum_{i} f_{i\gamma} E_{i\gamma} \qquad (33)$$

Dose-rate factor at body surface (s) -

$$DRF_{\gamma}^{s} = \sum_{i} f_{i\gamma} DRF_{\gamma}^{s}(E_{i\gamma})$$

$$= k/\rho_w \sum_{i} f_{i\gamma} E_{i\gamma} R_{\gamma}^{w}(E_{i\gamma}) \qquad (34)$$

Dose-rate factor for body organ k -

$$DRF_{\gamma}^{k} = \sum_{i} f_{i\gamma} DRF_{\gamma}^{k}(E_{i\gamma})$$

$$= k/\rho_{w} \sum_{i} f_{i\gamma} E_{i\gamma} R_{\gamma}^{w}(E_{i\gamma}) G^{k}(E_{i\gamma}) / \bar{R}_{\gamma}^{a}(E_{i\gamma}) \qquad (35)$$

Exposure to a contaminated ground surface. From Eqs. (26), (28), and (29), the dose-rate factors for exposure at a height z above a contaminated ground surface from the spectrum of photons in radioactive decay are as follows:

Dose-rate factor in air (a) -

$$DRF_{\gamma}^{a}(z) = \sum_{i} f_{i\gamma} DRF_{\gamma}^{a}(z, E_{i\gamma})$$

$$= \frac{1}{2}k \sum_{i} f_{i\gamma} E_{i\gamma} [(\mu_{en}/\rho)_{a}]_{i} \left\{ \tilde{E}_{1}(\mu_{a,i} z) - \frac{C_{a,i}}{(D_{a,i}-1)} \exp[(D_{a,i}-1)\mu_{a,i} z] \right\} \qquad (36)$$

Dose-rate factor at body surface (s) -

$$DRF_{\gamma}^{s}(z) = \sum_{i} f_{i\gamma} DRF_{\gamma}^{s}(z, E_{i\gamma})$$

$$= \frac{1}{2}k \sum_{i} f_{i\gamma} E_{i\gamma} [(\mu_{en}/\rho)_{a}]_{i} \; \bar{R}_{\gamma}^{a}(E_{i\gamma}) \left\{ \tilde{E}_{1}(\mu_{a,i} z) - \frac{C_{a,i}}{(D_{a,i}-1)} \exp[(D_{a,i}-1)\mu_{a,i} z] \right\} \qquad (37)$$

Dose-rate factor for body organ k -

$$\mathrm{DRF}_{\gamma}^{k}(z) = \sum_{i} f_{i\gamma}\mathrm{DRF}_{\gamma}^{k}(z,E_{i\gamma})$$

$$= \frac{1}{2}k \sum_{i} f_{i\gamma}E_{i\gamma}[(\mu_{en}/\rho)_a]_i \; G^k(E_{i\gamma}) \left\{ \tilde{E}_1(\mu_{a,i}z) - \frac{C_{a,i}}{(D_{a,i}-1)} \exp[(D_{a,i}-1)\mu_{a,i}z] \right\} \qquad (38)$$

The dose-rate factors in this report are calculated for a height z = 1 m above the ground surface.

Notation in dose-rate factor equations. The various quantities used in Eqs. (30)-(38) have the following definitions:

DRF = dose-rate factor in units of Sv/yr per Bq/cm^3 for air and water immersion or Sv/yr per Bq/cm^2 for ground surface exposure,

$f_{i\gamma}$ = intensity of ith photon in number per decay,

$E_{i\gamma}$ = energy of ith photon in MeV,

k = numerical constant equal to the product of 1.6×10^{-10} g-Gy/MeV and 3.15×10^{7} s/yr,

ρ_a,ρ_w = density of air, water in g/cm^3,

$\bar{R}_{\gamma}^{a}$ = ratio of photon mass energy-absorption coefficients in tissue and air averaged over spectrum of scattered photons in an infinite atmospheric cloud,

G^k = ratio of dose rate in body organ k to dose rate in an infinite atmospheric cloud,

R_{γ}^{w} = ratio of photon mass energy-absorption coefficients in tissue and water for emitted photon energy,

z = height of body surface above ground in cm,

$(\mu_{en}/\rho)_a$ = photon mass energy-absorption coefficient in air in cm^2/g,

$\tilde{E}_1$ = first-order exponential integral,

μ_a = photon linear attenuation coefficient in air in cm^{-1},

C_a,D_a = coefficients for Berger form of photon energy-absorption buildup factor in air.

2.3 Dose-Rate Factors for Electrons

This section presents the equations used to calculate electron dose-rate factors for radiosensitive tissues of the skin for each of the three exposure modes considered. In refs. 1 and 2, electron dose-rate factors were given for tissue-equivalent material at the body surface of an exposed individual, but these dose-rate factors do not apply to the skin or any other organ. Only organs near the body surface are of interest for external exposure to electrons from radioactive decay, because of the short range of such electrons in tissue.[19] Other organs of potential importance, such as the lens of the eye and the testes, are not considered in this report.

The methods used to calculate electron dose-rate factors for skin are based on the scaled point kernels and geometrical reduction factors developed by Berger.[7,8] The dose-rate factor equations for skin presented in this section have also been described by Kocher and Eckerman.[20]

In Sect. 2.3.1, the assumed locations of the radiosensitive tissues of the skin are described. In Sects. 2.3.2-2.3.4, the dose-rate factor equations for monoenergetic sources of electrons are given for each of the three exposure modes. Similar to the development of the dose-rate factor equations for photons, we first calculate for a given exposure mode the dose-rate factor in the medium surrounding the exposed individual, then the dose-rate factor at the body surface, and finally the dose-rate factor as a function of depth in tissue. The dose-rate factors in skin are obtained from the calculated depth-dose distribution in tissue. In Sect. 2.3.5, the dose-rate factor equations are then generalized to the spectrum of electrons from radioactive decay, as in Eq. (8).

2.3.1 Location of radiosensitive tissues of the skin

The ICRP has recommended that the dose to skin be calculated by assuming that the radiosensitive tissues lie at a single depth of 70 μm below the body surface.[21] For external exposure to electrons, this assumption usually results in a dose rate which is larger than the dose rate averaged over the thickness of the dermis, because the dermis extends to depths considerably greater than 70 μm (ref. 22) and the dose rate decreases approximately exponentially with depth.[7] Alternatively, in the mathematical phantom describing Reference Man,[12] the skin is represented as a layer of finite thickness extending from the body surface to a depth of 0.2 cm, and it is this representation which has been used to calculate the external dose-rate factors for skin for exposure to photons given in this report.

On the basis of the above considerations, we have calculated two different sets of electron dose-rate factors for the skin. On the one hand, we have calculated dose-rate factors by assuming that the radiosensitive tissues are located at a single depth of 70 μm below the body surface, in order to be consistent with the ICRP recommendation. On the other hand, we have also calculated dose-rate factors averaged over the entire thickness of the dermis as defined for Reference Man, in order to provide electron dose-rate factors which are reasonably consistent with the values for photons. In the latter calculations, the dermis is assumed to lie between 50 μm and 1,250 μm below the body surface.[22] For either calculation, the density of tissue is assumed to be 1.12 g/cm^3 independent of depth.[22]

2.3.2 Dose-rate factors from monoenergetic sources for immersion in contaminated water

The dose-rate factor equations for immersion in contaminated water are developed first, because the depth-dose distributions obtained by Berger[7,8] for this exposure mode are also used to calculate the depth-dose distributions for immersion in contaminated air.

Dose-rate factor in water. By analogy with Eq. (17) for photons, the dose-rate factor at any point in an infinite water medium which is uniformly contaminated with sources emitting electrons of energy E_ε is given by

$$\mathrm{DRF}_\varepsilon^w(E_\varepsilon) = kE_\varepsilon/\rho_w \quad . \tag{39}$$

Dose-rate factor at the body surface. The dose-rate factor at the body surface is obtained from the dose-rate factor in water by accounting for energy absorption in tissue relative to water for the spectrum of electrons incident upon the body surface and by accounting for the shielding at any point on the body surface provided by body tissues.

For photons, we have assumed that body tissues provide no shielding of the body surface from the source region. Electrons, on the other hand, have only a short range in tissue, so that the body tissues effectively shield the body surface from half of the source region. Thus, body shielding reduces the electron dose-rate factor at the body surface by a factor of 1/2 compared with the value in water.

For electrons, energy absorption in tissue relative to water is determined by the ratio of mass stopping powers, dE/dx, in the two media. Thus, we define the tissue-to-water energy-absorption ratio for immersion in contaminated water, R_ε^w, as

$$R_\varepsilon^w = (dE/dx)_t/(dE/dx)_w \quad , \tag{40}$$

where the ratio is evaluated at the emitted energy E_ε. Since the mass stopping powers in tissue and water are nearly identical at all energies,[19] the ratio R_ε^w evaluated at energy E_ε is essentially equal to the ratio averaged over the spectrum of electrons incident on the body surface due to scattering in water. Thus, the dose-rate factor at the body surface is calculated as

$$\mathrm{DRF}_\varepsilon^s(E_\varepsilon) = \tfrac{1}{2}kE_\varepsilon R_\varepsilon^w(E_\varepsilon)/\rho_w \quad . \tag{41}$$

In fact, R_ε^w is nearly unity at all energies so that this factor could just as well be omitted from Eq. (41). The equivalence of tissue and water with regard to energy absorption for electrons was assumed by Berger[7] in his calculations of depth-dose distributions described below.

Dose-rate factor as a function of depth in tissue. Berger[7] has calculated the electron dose rate as a function of depth in a semi-infinite tissue-equivalent target, which is assumed to be water, located adjacent to a semi-infinite, uniformly contaminated water medium. Similarly to the equations for photon organ dose-rate factors developed in this report, the electron dose-rate factor as a function of depth in tissue can be expressed as the product of the dose-rate factor in the medium surrounding the exposed individual and a function G^t which gives the reduction in dose-rate factor as a function of depth in tissue due to the exclusion of radioactive sources from the half-space of tissue. Thus, the dose-rate factor at depth x in tissue for electron energy E_ε is given by[7]

$$DRF_\varepsilon^t(x,E_\varepsilon) = kE_\varepsilon G^t(x/r_0^w,E_\varepsilon)/\rho_w \quad , \tag{42}$$

where $r_0^w = r_0^w(E_\varepsilon)$ is the mean electron range in water for energy E_ε, evaluated in the continuous-slowing-down approximation. Calculation of the G-function from electron specific absorbed fractions in water obtained by Monte Carlo techniques is described by Berger,[7] and extensive tables of this function are given in ref. 8.

The G-function, which Berger calls the geometrical reduction factor, is expressed not as a function of the depth x alone for a given energy, but as a function of the dimensionless parameter x/r_0^w. Scaling the depth in tissue by the electron range results in a geometrical reduction factor which is nearly independent of the emitted electron energy E_ε, a result which is illustrated in Fig. 7. The very weak energy dependence of G^t greatly facilitates interpolation of tabulated values. Also indicated in Fig. 7 is the range of scaled distances x/r_0^w corresponding to the radiosensitive dermis for each of the two emitted energies, as

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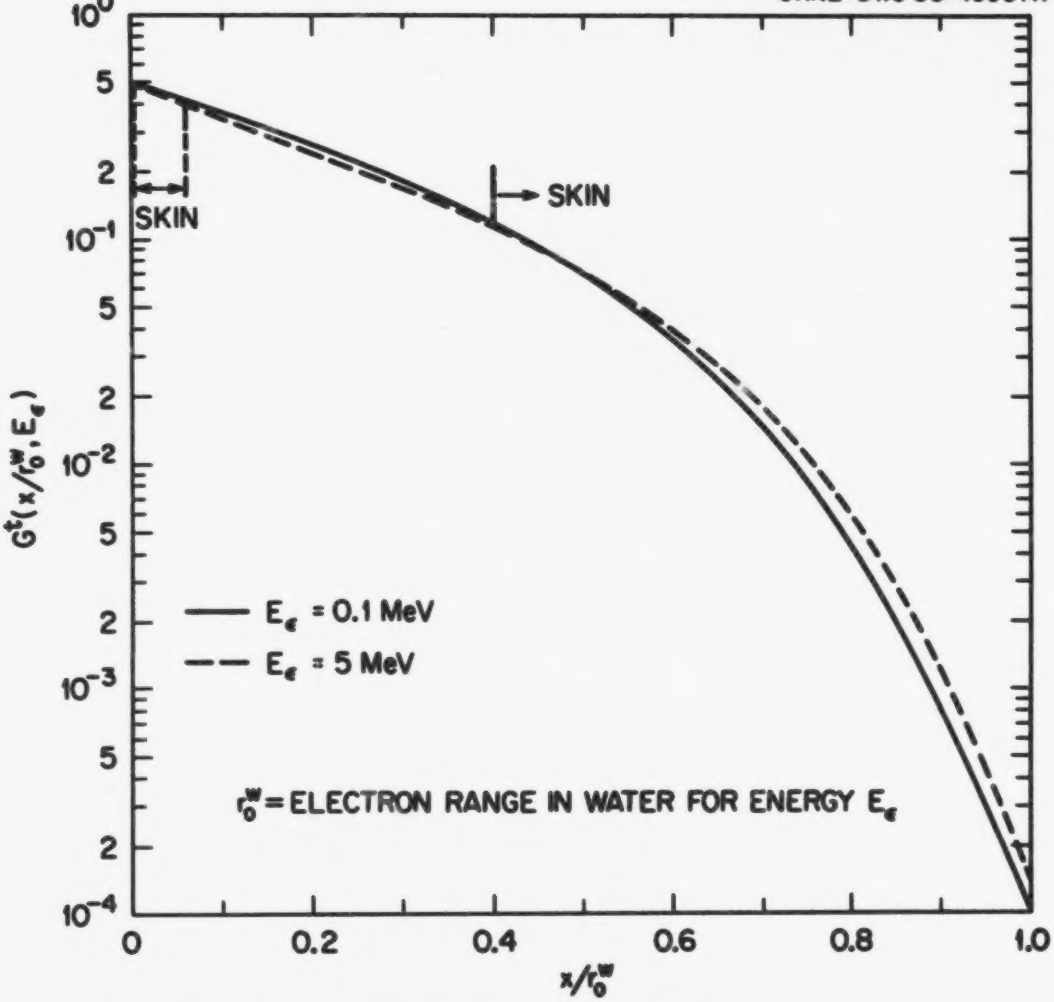

Fig. 7. Geometrical reduction factor, G, giving reduction in electron dose as a function of depth in tissue for immersion in a semi-infinite, uniformly contaminated water medium. The values are obtained from ref. 8 and are plotted vs the depth in tissue scaled by the mean electron range. The location of the radiosensitive tissues of the skin is indicated for each emitted electron energy.

defined previously in Sect. 2.3.1. It is evident that the spectrum of scattered electrons in water from a 0.1-MeV source penetrates only the front layer of the skin, so that the average dose rate over the dermis is much lower than for a 5-MeV source of equal strength. For any electron energy, the geometrical reduction factor at the body surface ($x/r_0^w = 0$) is 1/2, in agreement with the result in Eq. (41).

Berger[7] has also considered a leakage correction to the dose-rate factor as a function of depth in tissue in Eq. (42), which accounts for the finite lateral dimensions of the actual target region for an exposed individual and results in a reduction of the dose-rate factor near the body surface by as much as 10%, depending upon the electron energy. Including the leakage correction, denoted by $q(x,E_\varepsilon)$, the dose-rate factor as a function of depth in tissue becomes

$$DRF_\varepsilon^t(x,E_\varepsilon) = kE_\varepsilon q(x,E_\varepsilon)\ G^t(x/r_0^w,E_\varepsilon)/\rho_w \quad . \tag{43}$$

The leakage correction factor is represented by the empirical formula

$$q(x,E_\varepsilon) = 1 - q_1(E_\varepsilon)\ q_2(x/a) \quad , \tag{44}$$

where q_1 and the parameter a depend only on the emitted energy E_ε and q_2 depends only on the ratio x/a. The quantities q_1, a, and q_2 are obtained from Tables 3 and 4 of ref. 7.

2.3.3 Dose-rate factors from monoenergetic sources for immersion in contaminated air

Dose-rate factor in air. For immersion in contaminated air, we again assume that the exposed individual is standing at the boundary of a semi-infinite atmospheric cloud with uniform source concentration. In Sect. 2.2.1, we assumed that the photon dose-rate factor in air near the air-ground interface is one-half of the dose-rate factor in an infinite atmospheric cloud, due to the fact that the photon mean-free-path in air is usually large compared with the height of the exposed individual. Electrons, however, have a finite range in air and for energies less than about 0.5 MeV, the range in air is less than the height of an individual standing on the ground. Therefore, we make the conservative assumption that the electron dose-rate factor in air at any point near the air-ground interface is the same as the value inside an infinite atmospheric cloud, so that the dose-rate factor in air for emitted energy E_ε is assumed to be

$$DRF_\varepsilon^a(E_\varepsilon) = kE_\varepsilon/\rho_a \quad . \tag{45}$$

Equation (45) provides a conservative overestimate of the dose-rate factor in air near the air-ground interface, because the dose-rate factor at the interface is approximately one-half of the value far above ground for any electron energy and the value at any height above ground will be less than the infinite-cloud value by a factor between 1/2 and 1 if the electron range in air is greater than that height. Thus, the presence of the air-ground interface reduces the electron dose-rate factor in air averaged over the height of the body surface above ground by a factor between 1/2 and 1 compared with the infinite cloud value, the particular value depending on the electron energy. The equation developed in this section for the dose-rate factor in tissue as a function of depth below the body surface also provides a conservative overestimate of the dose-rate factor for skin for immersion in contaminated air by the same factor.

Dose-rate factor at the body surface. As with immersion in contaminated water, the body tissues are assumed to shield the body surface from half of the source region, so that the dose-rate factor at the body surface is 1/2 of the dose-rate factor in air. In addition, we again apply a correction factor describing energy absorption in tissue relative to air. For emitted energy E_ε, the tissue-to-air energy absorption ratio for immersion in contaminated air is defined as

$$R_\varepsilon^a = (dE/dx)_t/(dE/dx)_a \quad , \tag{46}$$

where the ratio is again evaluated at energy E_ε. Shown in Fig. 8 are values of the ratio in Eq. (46) compared with values properly averaged

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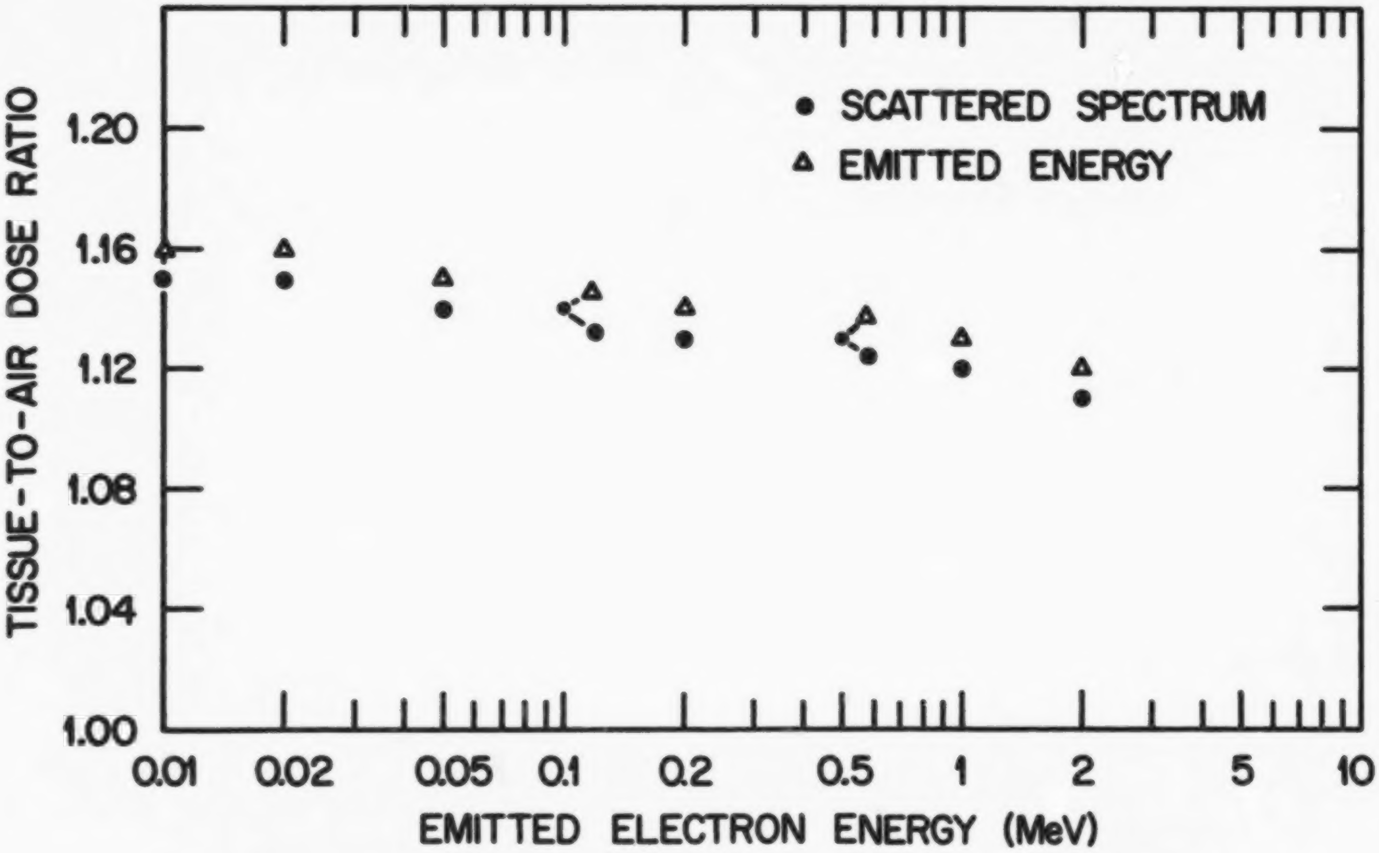

Fig. 8. Ratios of dose in tissue to dose in air for tissue immersed in an infinite, uniformly contaminated atmospheric cloud vs emitted electron energy. The solid symbols from ref. 7 give the dose ratio averaged over the scattered electron spectrum in air. The triangles give the ratio evaluated at the emitted energy from ref. 19.

over the spectrum of scattered electrons in air from monoenergetic sources.[7] The comparison shows that evaluation of the tissue-to-air energy-absorption ratio at the emitted energy leads to errors in the dose-rate factor at the body surface of less than 1% over a wide range of energies. Therefore, it is an excellent approximation to calculate the body surface dose-rate factor as

$$DRF^s_\varepsilon(E_\varepsilon) = \tfrac{1}{2}kE_\varepsilon R^a_\varepsilon(E_\varepsilon)/\rho_a \quad . \qquad (47)$$

Dose-rate factor as a function of depth in tissue. According to the formulation of Berger,[7] the dose-rate factor for emitted energy E_ε as a function of depth in tissue for immersion in contaminated air can be obtained from the dose-rate factor in air in Eq. (45) by applying the geometrical reduction factor G^t for immersion in contaminated water, the leakage correction factor $q(x,E_\varepsilon)$ defined in Eq. (44), and a factor which accounts for the difference between energy absorption in tissue and air. The latter factor may be written as $R^a_\varepsilon(E_\varepsilon)/\alpha(E_\varepsilon)$, where $R^a_\varepsilon(E_\varepsilon)$ is the tissue-to-air energy-absorption ratio for emitted energy E_ε defined in Eq. (46) and $\alpha(E_\varepsilon)$ is a correction factor which differs from unity by 2% or less over a wide range of energies.[7] Therefore, the dose-rate factor as a function of depth in tissue for immersion in contaminated air is given by

$$DRF^t_\varepsilon(x,E_\varepsilon) = (kE_\varepsilon/\rho_a)(R^a_\varepsilon/\alpha)\ q(x,E_\varepsilon)\ G^t(x/r^w_o,E_\varepsilon) \quad . \qquad (48)$$

2.3.4 Dose-rate factors from monoenergetic sources for exposure to a contaminated ground surface

Dose-rate factor in air. As in Sect. 2.2.3 for photon sources, the dose-rate factor in air at any height above ground due to monoenergetic sources of electrons uniformly distributed on a smooth infinite ground surface can only be obtained from explicit knowledge of the electron specific absorbed fraction in air. By analogy with Eq. (21) for photons, the dose-rate factor in air at a height z above ground for electron energy E_ε is given by

$$DRF_{\varepsilon}^{a}(z,E_{\varepsilon}) = kE_{\varepsilon}\int_{\sigma} \Phi_{\varepsilon}^{a}(r,E_{\varepsilon})\, d\sigma \quad , \tag{49}$$

where r is the distance from any point on the ground to the receptor position in air and σ denotes the ground surface.

An analytical equation for the electron specific absorbed fraction, analogous to Eq. (22) for photons, has not been developed. Therefore, Eq. (49) must be evaluated using numerical methods and tabulated values of specific absorbed fractions obtained by Monte Carlo techniques.

In order to minimize the dependence of the specific absorbed fraction on electron energy and, thus, to facilitate interpolation of tabulated values, Berger[7,8] has introduced the dimensionless scaled point kernel, denoted by $F_{\varepsilon}(r/r_0,E_{\varepsilon})$, defined in terms of the specific absorbed fraction by the equation

$$F_{\varepsilon}(r/r_0,E_{\varepsilon})\, d(r/r_0) = 4\pi\rho\Phi_{\varepsilon}(r,E_{\varepsilon})r^2\, dr \quad , \tag{50}$$

where r_0 is the mean electron range at energy E_{ε} in the medium of density ρ. The scaling is accomplished by expressing distances in units of the electron range.

Substitution of Eq. (50) into Eq. (49) using Eq. (23) for the element of surface area yields the dose-rate factor in air for a height z above ground as

$$DRF_{\varepsilon}^{a}(z,E_{\varepsilon}) = \frac{1}{2}(kE_{\varepsilon}/\rho_a)(1/r_0^a)\, \Omega(z,E_{\varepsilon}) \quad , \tag{51}$$

where the quantity $\Omega(z,E_{\varepsilon})$ is the integral over the ground surface of the scaled point kernel for energy E_{ε} given by

$$\Omega(z,E_{\varepsilon}) = \int_{z/r_0^a}^{\infty} \frac{1}{u}\, F_{\varepsilon}^{a}(u,E_{\varepsilon})\, du \quad , \tag{52}$$

and u is the scaled distance

$$u = r/r_o^a \quad . \tag{53}$$

The scaled point kernel in air, F_ε^a, is obtained from the scaled point kernels in water, F_ε^w, tabulated by Berger[8] according to the equation

$$F_\varepsilon^a(u,E_\varepsilon) = \alpha'(E_\varepsilon)\, F_\varepsilon^w(\alpha' u,E_\varepsilon) \quad , \tag{54}$$

where $\alpha'(E_\varepsilon)$ is a scaling parameter calculated by Berger[7] and is approximately 1.02 over a wide range of electron energies.

Because electrons have a finite range in air, the integral over the ground surface in Eq. (52) vanishes unless the electron range in air is greater than the height z above ground. For energies less than this minimum value, the specific absorbed fraction is zero. For a height of 1 m in air, the minimum electron energy giving a non-zero dose-rate factor in air is about 0.32 MeV.[19] Furthermore, the integral in Eq. (52) vanishes for distances r greater than the maximum range of electrons of energy E_ε in air, so that the upper limit of integration is effectively finite. For electron energies of interest in radioactive decay, the scaled point kernel in water F_ε^w is zero for values of the scaled distance u greater than 1.25.[8]

Dose-rate factor at the body surface. The dose-rate factor at the body surface for height z above the ground is obtained from the dose-rate factor in air in Eq. (51) by multiplying by a factor of 1/2 to account for the shielding by body tissues from half of the source region and by the tissue-to-air energy-absorption ratio defined in Eq. (46). The energy-absorption ratio evaluated at energy E_ε is again expected to be a very good approximation to the ratio averaged over the energy spectrum at the body surface. Thus,

$$DRF_\varepsilon^s(z,E_\varepsilon) = \frac{1}{4}(kE_\varepsilon/\rho_a)(1/r_o^a)\, R_\varepsilon^a(E_\varepsilon)\, \Omega(z,E_\varepsilon) \quad , \tag{55}$$

where Ω is defined in Eq. (52).

Dose-rate factor as a function of depth in tissue. In principle, the electron dose-rate factor as a function of depth in tissue for exposure to a contaminated ground surface should be calculated by considering transport of the radiations in air between the ground and the height of the body surface followed by transport through the body tissues. However, neither empirical equations nor tabulations of results obtained using Monte Carlo techniques have been presented for the specific absorbed fraction for electrons transported through two different media. It is also evident that the geometrical reduction factor G^t developed by Berger[7,8] to obtain depth-dose distributions for immersion in contaminated air or water cannot be applied to the case of ground-surface exposure, because this function applies only to a semi-infinite source volume in contact with the exposed individual.

In the calculations performed here, the problem of describing electron transport through air followed by tissue is reduced to a consideration of transport through air alone by assuming that the thickness of tissue can be replaced by an equivalent thickness of air which is then added to the height z of the body surface above ground. That is, for depth x in tissue, we calculate the dose-rate factor in tissue located at a height z' above ground given by

$$z' = z + 1.14(\rho_t/\rho_a)x \quad , \qquad (56)$$

where ρ_t and ρ_a are the densities of tissue and air, respectively, and the factor 1.14 gives a good approximation to the tissue-to-air stopping power ratio at any electron energy (e.g., see Fig. 8). Therefore, for the height z' above ground corresponding to the depth x in tissue, the dose-rate factor in tissue is obtained from Eq. (55) by replacing the height z by z':

$$DRF_\varepsilon^t(z',E_\varepsilon) = \frac{1}{4}(kE_\varepsilon/\rho_a)(1/r_o^a)\; R_\varepsilon^a(E_\varepsilon)\; \Omega(z',E_\varepsilon) \quad , \qquad (57)$$

where $\Omega(z',E_\varepsilon)$ is obtained by replacing z by z' in Eq. (52).

In this report, the electron dose-rate factors for radiosensitive tissues of the skin are based on the single value $z = 1$ m for the height of the body surface above ground. For photons, we have previously argued that organ dose-rate factors based on the single height of 1 m are a reasonable approximation to the values averaged over a height of 2 m for an exposed individual standing on the ground. Figure 9 shows electron dose-rate factors at a depth of 70 μm in tissue and values averaged over the thickness of the dermis calculated for three different heights of the body surface above ground. These results show that the dose-rate factors in skin at a height of 1 m give a reasonable approximation to the average of the values at the ground (0.01 m) and the top of the head (2 m) only for electron energies above about 1 MeV. For energies below 1 MeV, however, this is no longer the case, due to the increase with height of the minimum electron energy contributing to the dose-rate factor for skin, and the dose-rate factors at 1 m appear to underestimate the value averaged over a height of 2 m. For energies below 0.36 MeV, in particular, the dose-rate factors at 1 m are zero, which is clearly an inappropriate approximation to the values averaged over the 2 m height above ground.

A further difficulty with the use of eq. (57) to calculate electron dose-rate factors from a contaminated ground surface arises from the assumption implicit in Eq. (56), which defines the equivalent distance in air between the ground surface and the skin tissues, that the angular distribution of electrons incident upon the body surface is isotropic. Although electron angular distributions above ground have not been calculated, it seems reasonable on the basis of angular distributions for photons shown in Fig. 6 that the electron radiation field is not isotropic at a height of 1 m. As with photons, however, we have no indication of the magnitude of possible errors in the dose-rate factors due to the anisotropic angular distributions.

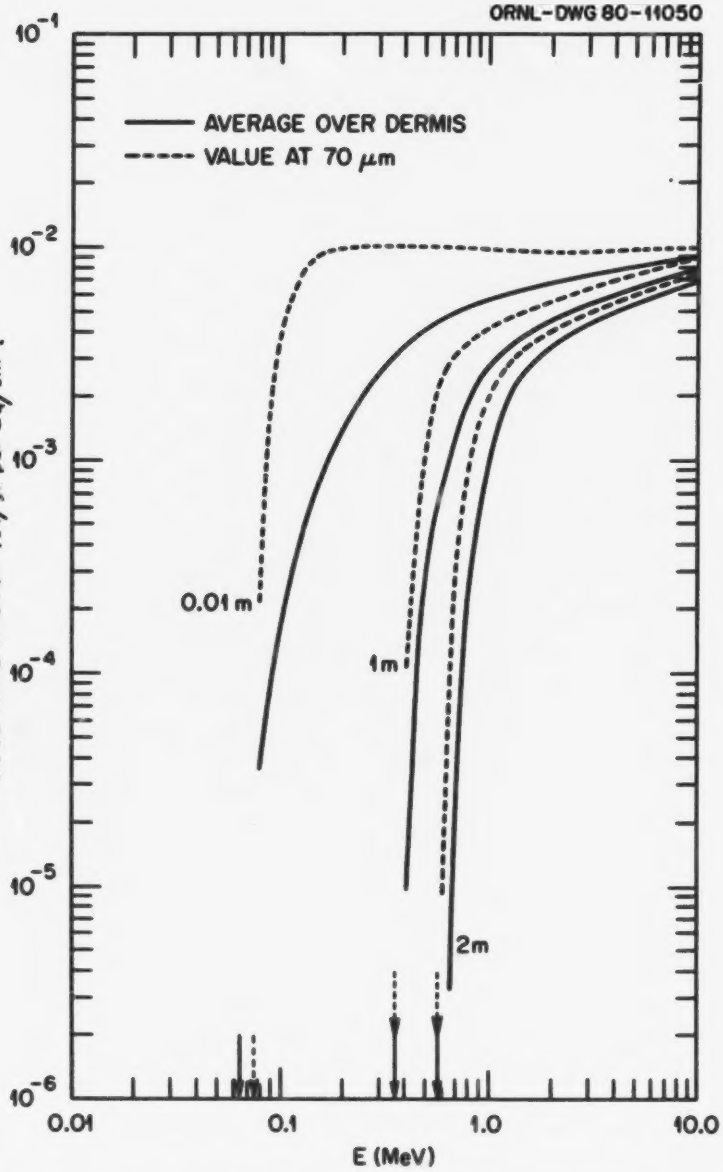

Fig. 9. Electron dose-rate factors for skin vs emitted electron energy for exposure to a contaminated ground surface at three different heights of the body surface above ground. The arrows at the bottom of the figure give the energies at which the dose-rate factors are zero, due to the finite electron range in air.

2.3.5 Dose-rate factors for electron spectra from radioactive decay

In this section, the dose-rate factor equations developed for sources of monoenergetic electrons for each of the three exposure modes are generalized to give the dose-rate factor equations for the spectra of discrete and continuous radiations resulting from the decay of a particular radionuclide. The generalization is based on Eq. (8) (i.e., the dose-rate factor for each discrete or continuous electron in the spectrum is weighted by its intensity and the results are summed over all radiations in the spectrum). For all three exposure modes, the dose-rate factors for skin are obtained from the dose-rate factor as a function of depth in tissue using the assumed locations of the radiosensitive tissues described in Sect. 2.3.1.

Immersion in contaminated water. From Eqs. (39), (41), and (43), the dose-rate factors for immersion in contaminated water from the spectrum of discrete and continuous electrons in radioactive decay are as follows:

Dose-rate factor in water (w) -

$$
\begin{aligned}
\mathrm{DRF}_{\varepsilon}^{w} &= \sum_{i} f_{ie}\mathrm{DRF}_{\varepsilon}^{w}(E_{ie}) + \sum_{j} f_{j\beta}\int_{0}^{E_{j\beta}^{\max}} N_{j\beta}(E)\mathrm{DRF}_{\varepsilon}^{w}(E)\,dE \\
&= k/\rho_{w}\left[\sum_{i} f_{ie}E_{ie} + \sum_{j} f_{j\beta}\int_{0}^{E_{j\beta}^{\max}} N_{j\beta}(E)E\,dE\right] \qquad (58)
\end{aligned}
$$

Dose-rate factor at body surface (s) -

$$\begin{aligned} DRF_{\varepsilon}^{s} &= \sum_{i} f_{ie} DRF_{\varepsilon}^{s}(E_{ie}) + \sum_{j} f_{j\beta} \int_{0}^{E_{j\beta}^{max}} N_{j\beta}(E) DRF_{\varepsilon}^{s}(E)\, dE \\ &= \tfrac{1}{2} k/\rho_{w} \left[\sum_{i} f_{ie} E_{ie} R_{\varepsilon}^{w}(E_{ie}) \right. \\ &\quad \left. + \sum_{j} f_{j\beta} \int_{0}^{E_{j\beta}^{max}} N_{j\beta}(E) E\, R_{\varepsilon}^{w}(E)\, dE \right] \end{aligned} \qquad (59)$$

Dose-rate factor as a function of depth in tissue (t) -

$$\begin{aligned} DRF_{\varepsilon}^{t}(x) &= \sum_{i} f_{ie} DRF_{\varepsilon}^{t}(x, E_{ie}) \\ &\quad + \sum_{j} f_{j\beta} \int_{0}^{E_{j\beta}^{max}} N_{j\beta}(E) DRF_{\varepsilon}^{t}(x, E)\, dE \\ &= k/\rho_{w} \left[\sum_{i} f_{ie} E_{ie}\, q(x, E_{ie})\, G^{t}(x/r_{o}^{w}, E_{ie}) \right. \\ &\quad \left. + \sum_{j} f_{j\beta} \int_{0}^{E_{j\beta}^{max}} N_{j\beta}(E) E\, q(x, E)\, G^{t}(x/r_{o}^{w}, E)\, dE \right] \end{aligned} \qquad (60)$$

Immersion in contaminated air. From Eqs. (45), (47), and (48), the dose-rate factors for immersion in contaminated air from the spectrum of discrete and continuous electrons in radioactive decay are as follows:

Dose-rate factor in air (a) -

$$\mathrm{DRF}_{\varepsilon}^{a} = \sum_{i} f_{ie}\mathrm{DRF}_{\varepsilon}^{a}(E_{ie}) + \sum_{j} f_{j\beta}\int_{0}^{E_{j\beta}^{max}} N_{j\beta}(E)\mathrm{DRF}_{\varepsilon}^{a}(E)\,dE$$

$$= k/\rho_a \left[\sum_{i} f_{ie}E_{ie} + \sum_{j} f_{j\beta}\int_{0}^{E_{j\beta}^{max}} N_{j\beta}(E)E\,dE \right] \quad (61)$$

Dose-rate factor at body surface (s) -

$$\mathrm{DRF}_{\varepsilon}^{s} = \sum_{i} f_{ie}\mathrm{DRF}_{\varepsilon}^{s}(E_{ie}) + \sum_{j} f_{j\beta}\int_{0}^{E_{j\beta}^{max}} N_{j\beta}(E)\mathrm{DRF}_{\varepsilon}^{s}(E)\,dE$$

$$= \tfrac{1}{2}k/\rho_a \left[\sum_{i} f_{ie}E_{ie}R_{\varepsilon}^{a}(E_{ie}) \right.$$

$$\left. + \sum_{j} f_{j\beta}\int_{0}^{E_{j\beta}^{max}} N_{j\beta}(E)E\; R_{\varepsilon}^{a}(E)\,dE \right] \quad (62)$$

Dose-rate factor as a function of depth in tissue (t) -

$$\mathrm{DRF}_{\varepsilon}^{t}(x) = \sum_{i} f_{ie}\mathrm{DRF}_{\varepsilon}^{t}(x,E_{ie})$$

$$+ \sum_{j} f_{j\beta}\int_{0}^{E_{j\beta}^{max}} N_{j\beta}(E)\mathrm{DRF}_{\varepsilon}^{t}(x,E)\,dE$$

$$= k/\rho_a \left[\sum_{i} f_{ie}E_{ie}(R_{\varepsilon}^{a}/\alpha)\; q(x,E_{ie})\; G^{t}(x/r_o^{w},E_{ie}) \right.$$

$$\left. + \sum_{j} f_{j\beta}\int_{0}^{E_{j\beta}^{max}} N_{j\beta}(E)E\; (R_{\varepsilon}^{a}/\alpha)\; q(x,E)\; G^{t}(x/r_o^{w},E)\,dE \right] \quad (63)$$

Exposure to a contaminated ground surface. From Eqs. (51), (55), and (57), the dose-rate factors for exposure at a height z above a contaminated ground surface from the spectrum of discrete and continuous electrons in radioactive decay are as follows:

Dose-rate factor in air (a) -

$$DRF_{\varepsilon}^{a}(z) = \sum_{i} f_{ie} DRF_{\varepsilon}^{a}(z,E_{ie}) + \sum_{j} f_{j\beta}\int_{0}^{E_{j\beta}^{max}} N_{j\beta}(E) DRF_{\varepsilon}^{a}(z,E)\, dE$$

$$= \tfrac{1}{2}k/\rho_a \left[\sum_{i} f_{ie}E_{ie}(1/r_o^a)\, \Omega(z,E_{ie}) + \sum_{j} f_{j\beta}\int_{0}^{E_{j\beta}^{max}} N_{j\beta}(E)E\, (1/r_o^a)\, \Omega(z,E)\, dE\right] \qquad (64)$$

Dose-rate factor at body surface (s) -

$$DRF_{\varepsilon}^{s}(z) = \sum_{i} f_{ie} DRF_{\varepsilon}^{s}(z,E_{ie}) + \sum_{j} f_{j\beta}\int_{0}^{E_{j\beta}^{max}} N_{j\beta}(E) DRF_{\varepsilon}^{s}(z,E)\, dE$$

$$= \tfrac{1}{4}k/\rho_a \left[\sum_{i} f_{ie}E_{ie}(1/r_o^a)\, R_{\varepsilon}^{a}(E_{ie})\, \Omega(z,E_{ie}) + \sum_{j} f_{j\beta}\int_{0}^{E_{j\beta}^{max}} N_{j\beta}(E)E\, (1/r_o^a)\, R_{\varepsilon}^{a}(E)\, \Omega(z,E)\, dE\right] \qquad (65)$$

Dose-rate factor as a function of depth in tissue (t) -

$$\begin{aligned} DRF_{\varepsilon}^{t}(z') = & \sum_{i} f_{ie} DRF_{\varepsilon}^{t}(z',E_{ie}) \\ & + \sum_{j} f_{j\beta} \int_{0}^{E_{j\beta}^{max}} N_{j\beta}(E) DRF_{\varepsilon}^{t}(z',E)\, dE \\ = & \tfrac{1}{4} k/\rho_a \left[\sum_{i} f_{ie} E_{ie} (1/r_o^a)\, R_{\varepsilon}^{a}(E_{ie})\, \Omega(z',E_{ie}) \right. \\ & \left. + \sum_{j} f_{j\beta} \int_{0}^{E_{j\beta}^{max}} N_{j\beta}(E) E\, (1/r_o^a)\, R_{\varepsilon}^{a}(E)\, \Omega(z',E)\, dE \right] \quad (66) \end{aligned}$$

In these equations,

$$\Omega(z,E_{\varepsilon}) = \int_{z/r_o^a}^{\infty} \frac{1}{u} F_{\varepsilon}^{a}(u,E_{\varepsilon})\, du \quad (67)$$

$$u = r/r_o^a \quad (68)$$

$$z' = z + 1.14(\rho_t/\rho_a)x \quad (69)$$

The dose-rate factors in this report are calculated for a height $z = 1$ m above the ground surface.

Notation in dose-rate factor equations. The various quantities used in Eqs. (58)-(69) have the following definitions:

DRF = dose-rate factor in units of Sv/yr per Bq/cm^3 for air and water immersion or Sv/yr per Bq/cm^2 for ground surface exposure,

f_{ie} = intensity of ith discrete electron in number per decay,

E_{ie} = energy of ith discrete electron in MeV,

$f_{j\beta}$ = intensity of jth continuous electron spectrum in number per decay,

$E_{j\beta}^{max}$ = end-point energy in MeV for jth continuous electron spectrum,

$N_{j\beta}(E)$ = energy distribution function for jth continuous electron spectrum,

k = numerical constant equal to the product of 1.6×10^{-10} g-Gy/MeV and 3.15×10^{7} s/yr,

ρ_a, ρ_w, ρ_t = density of air, water, tissue in g/cm^3,

R_{ε}^{w} = ratio of electron mass stopping powers in tissue and water for emitted electron energy,

R_{ε}^{a} = ratio of electron mass stopping powers in tissue and air for emitted electron energy,

x = distance from body surface to radiosensitive tissues in cm,

q = leakage correction factor to geometrical reduction factor G^t,

G^t = ratio of dose rate at a depth in tissue to the dose rate in an infinite water medium,

r_o^w, r_o^a = mean electron range in water, air,

α = scaling parameter giving correction factor for tissue-to-air energy-absorption ratio,

z = height of body surface above ground in cm,

F_{ε}^{a} = electron scaled point kernel in air [see Eq. (54)].

2.4 Adequacy of Idealized Dose-Rate Factors

In deriving the photon and electron dose-rate factor equations in Sects. 2.2 and 2.3, we have already discussed some of the uncertainties and limitations inherent in the results. In particular, we discussed the effects of the air-ground interface on the dose-rate factors for immersion in contaminated air and, for ground-surface exposure, potential uncertainties involved in calculating dose-rate factors for a single height above ground and assuming isotropic radiation fields above ground. In this section, we return to a consideration of the idealized exposure conditions assumed in calculating the dose-rate factors; namely, the assumptions that the contaminated air, water, or ground surface are effectively semi-infinite or infinite in extent and the radionuclide concentration is uniform throughout the source region. The question naturally arises as to the extent to which these idealized conditions are ever realized for actual releases of radionuclides to the environment and subsequent exposures of the population.

We first consider the idealized exposure conditions as they apply to the calculation of electron dose-rate factors. Since electrons have a finite range in air or water, the idealized assumptions should nonetheless result in reasonably realistic dose-rate factors provided the radionuclide concentration in the air or water or on the ground surface does not vary significantly over a distance from the receptor position equal to the electron range. Variations in concentration beyond the electron range are of no consequence. Figure 10 shows the electron range in air as a function of energy[19] for the range of electron energies of interest in radioactive decay. The corresponding range in water is about three orders of magnitude less than the values shown in the figure. The maximum electron range in air of potential importance in environmental radiological assessments is seen to be only about 40 m. For most radionuclides, in fact, the maximum electron energy is less than 4 MeV, and the corresponding range in air is less than 20 m. Thus, the idealized assumptions for the electron dose-rate factors are appropriate for actual exposures of the population provided the radionuclide concentration is approximately uniform over distances of no more than a few tens of meters from the receptor position for immersion in contaminated air and ground surface exposure and distances of no more than a few centimeters from the receptor position for immersion in contaminated water. Such a condition is certainly achieved for water immersion, and, for the exposure modes involving electron transport in air, it seems likely that such a condition is achieved to a reasonably good approximation for sources which are widely dispersed in the environment. Only for unusual exposure conditions, such as the

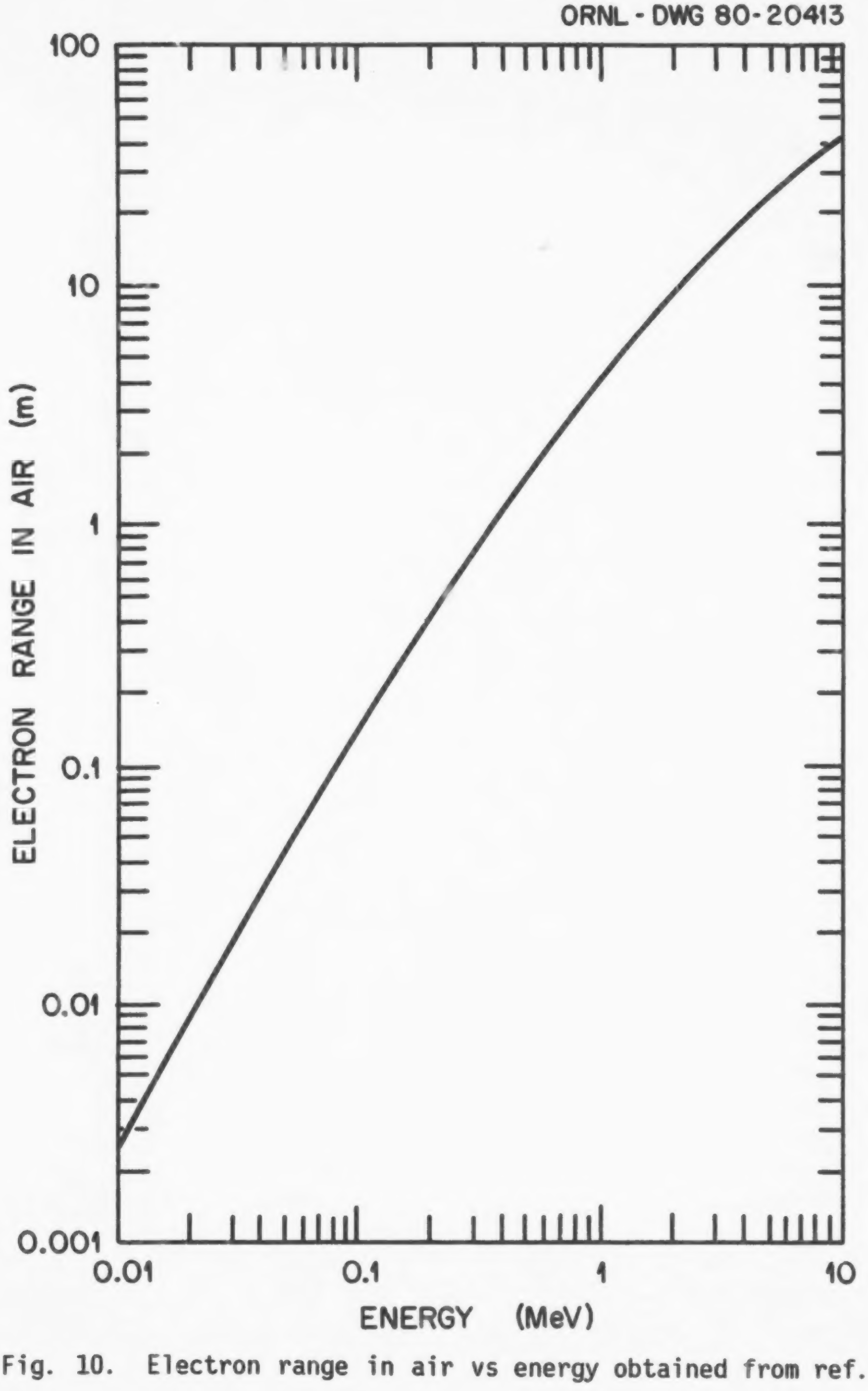

Fig. 10. Electron range in air vs energy obtained from ref. 19.

receptor position located in close proximity to a highly localized release to the atmosphere at or near the ground surface, would the idealized dose-rate factors not appear to be appropriate for electrons.

Photons, as opposed to electrons, do not have a finite range in air or water, as can be seen from the specific absorbed fraction in Eq. (22). However, the specific absorbed fraction decreases approximately exponentially with distance from a point source, so that sources at relatively large distances do not contribute significantly to the dose rate at a given point. This is illustrated in Fig. 11, which depicts the ratio of the dose rate at the center of a finite, uniformly contaminated atmospheric cloud of a given radius to the dose rate in an infinite atmospheric cloud with the same source concentration. We find that for immersion in contaminated air, about 85% of the dose rate at the receptor position is due to photons emitted within a distance of three mean-free-paths. A similar result applies for immersion in contaminated water.

For a maximum photon energy from radioactive decay of about 10 MeV, a distance of three mean-free-paths in water corresponds to a distance of only about 2 m.[11] Therefore, the idealized exposure conditions would seem to be appropriate in almost all cases for the photon dose-rate factors for immersion in contaminated water. For the other two exposure modes, however, the data plotted in Fig. 12 show that the photon mean-free-path in air is almost 250 m at 4 MeV and nearly 400 m at 10 MeV.[11] Therefore, if the radionuclides in the atmospheric cloud or on the ground surface emit high-energy photons of significant intensity, the results in Figs. 11 and 12 show that the sources would have to be widely dispersed and the concentration would have to be approximately uniform over distances of a few hundred meters or more from the receptor position in order for the idealized dose-rate factors to yield reasonably accurate dose-rate estimates. It is clear that these conditions do not strictly apply for many realistic exposure situations, such as exposure to puffs resulting from acute releases to the atmosphere, exposure at locations close to localized releases, and exposure to elevated plumes in the atmosphere. Therefore, the photon dose-rate factors for air immersion and ground surface exposure should be applied

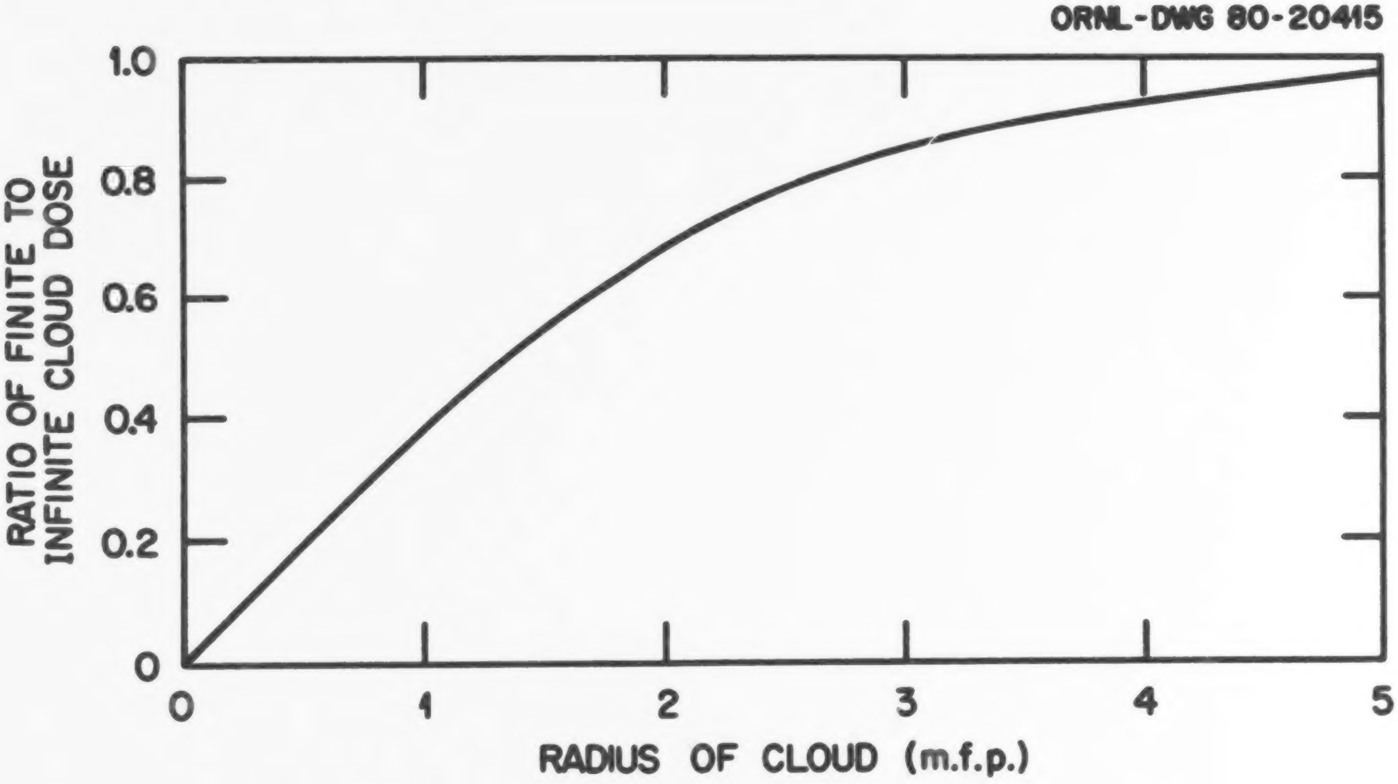

Fig. 11. Ratio of photon dose rate at the center of a finite spherical atmospheric cloud with uniform source concentration to the dose rate in an infinite atmospheric cloud with the same concentration vs radius of the finite cloud in photon mean-free-paths.

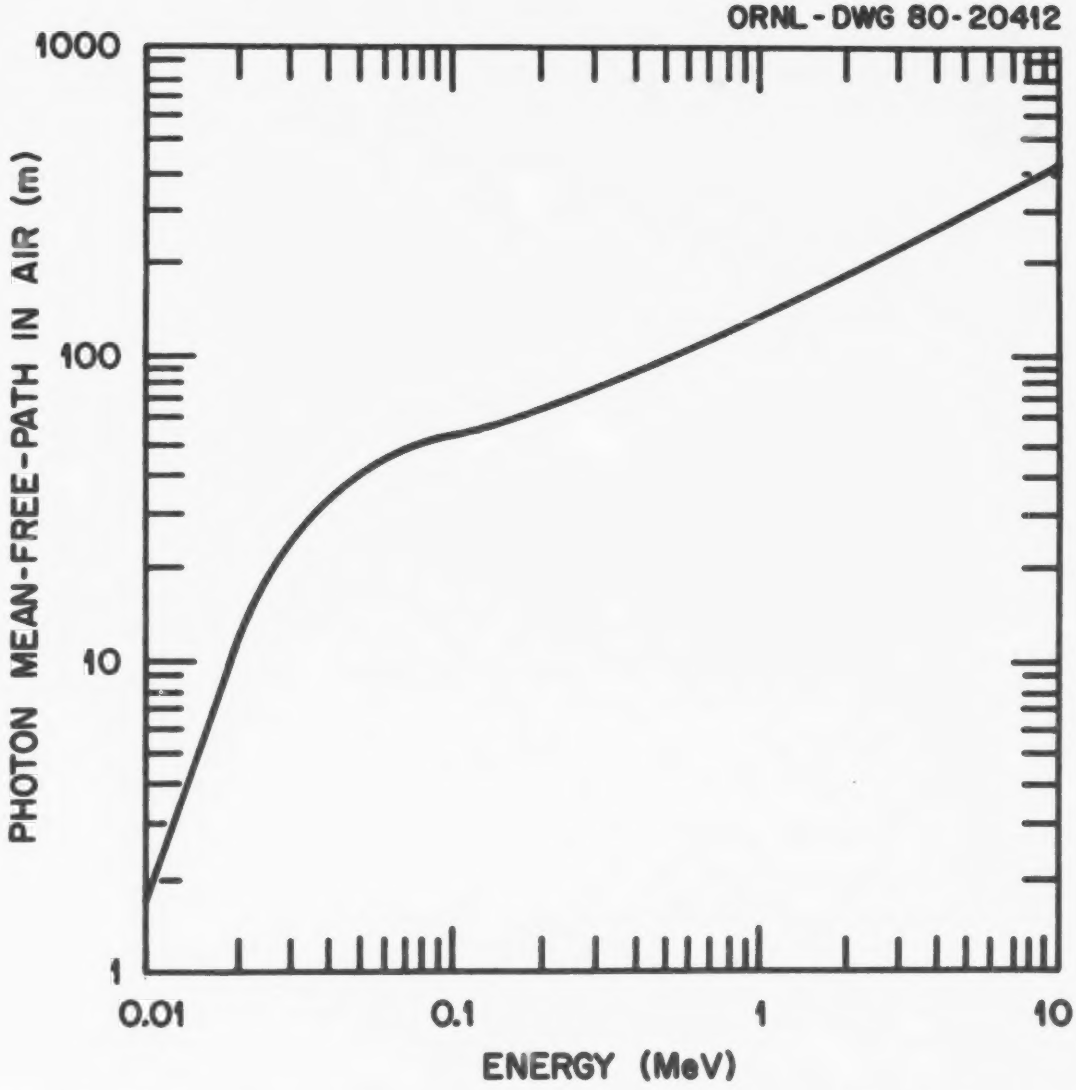

Fig. 12. Photon mean-free-path in air vs energy obtained from ref. 11.

to environmental radiological assessments only after due consideration of the extent of the source region and the variation of radionuclide concentration with location. We note that the idealized photon dose-rate factors are nonetheless likely to be used quite extensively even for exposure conditions for which they are not strictly applicable, particularly if they are expected to provide conservative overestimates of actual dose rates, because more realistic calculations are considerably more difficult and expensive.

The dose-rate factors for air immersion and ground surface exposure described in this report assume that all exposed individuals are standing outdoors on a smooth ground surface. Realistic population dose assessments should also include corrections to the dose-rate factors to account for effects such as building shielding during indoor residence, shielding provided by buildings in close proximity to one another in urban environments, ground roughness and terrain irregularities, and penetration of radionuclides into the ground with time.

3. THE REVISED DOSFACTER COMPUTER CODE

The revised version of the DOSFACTER computer code described in this report was written to calculate photon dose-rate factors for 24 body organs and electron dose-rate factors for the skin for immersion in contaminated air, immersion in contaminated water, and exposure at a height of 1 m above a contaminated ground surface. For a given radionuclide, the code calculates organ dose-rate factors for photons from Eqs. (32), (35), and (38), and electron depth-dose distributions in tissue from Eqs. (60), (63), and (66). The electron dose-rate factors for skin are obtained according to the descriptions of the location of radiosensitive tissues given in Sect. 2.3.1. The code also calculates body-surface dose-rate factors for photons and electrons from Eqs. (31), (34), (37), (59), (62), and (65). The user should again note that the body surface does not correspond to a radiosensitive tissue of interest.

The DOSFACTER computer code is written in FORTRAN IV for the IBM computers at Oak Ridge National Laboratory. Core storage requirements are 270K bytes. The total amount of computing time required on the IBM 360-91 computer to produce the results for the 500 radionuclides tabulated in this report is approximately 20 min.

3.1 Description of Subroutines and Calculational Procedures

A listing of the revised DOSFACTER computer code* is given in Appendix A. The code consists of a main program and 15 subroutines and function subprograms. This section briefly describes each module in the code and the numerical procedures executed therein.

The MAIN PROGRAM serves only to call the subroutines which write the headings for each table of output, read and write the input data, and calculate the dose-rate factors and write the results. The main program also terminates the calculations upon detection of an end-of-file with the input data.

SUBROUTINE PRINT writes the headings for each of the different tables of output onto the lineprinter. A total of 23 different tables are produced by the code. The first table gives the number of spectral lines emitted by each input radionuclide according to type continuous negative electrons (betas) from beta decay, positrons from beta decay, discrete electrons, and photons. The next four tables list the energy and intensity for each radiation of the four different types given above emitted by each input radionuclide. For continuous electrons from beta decay, both the end-point energy and average energy are given. The next three tables list the body-surface dose-rate factors for the three exposure modes for each input radionuclide, including the sum of the photon and electron values. The next nine tables list the photon organ dose-rate factors; for each exposure mode, three tables are required to list the values for the 24 different body organs. The next three tables list the electron dose-rate factors for skin. Values are given for the front, midpoint, and back of the dermis as defined in Sect. 2.3.1, the average over the thickness of the dermis, and at a depth of 70 μm. The last three tables list the skin dose-rate factors for photons and electrons together. The electron dose-rate factor is the value at a depth of 70 μm, and the sum of the photon and electron values is given.

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*The revised DOSFACTER code, the radioactive decay data base for the 500 radionuclides which serves as input for the code, and a complete listing of the dose-rate factor output are available upon request from the Radiation Shielding Information Center, Oak Ridge National Laboratory, P.O. Box X, Oak Ridge, TN 37830.

Each table of output generated by the code is written using a different output device number. In the listing given in Appendix A, the 23 different tables are written on output device numbers 10 through 32. The basic advantage of this system is that unwanted output can easily be omitted at the user's discretion by proper use of JCL statements for the output. For example, in order to write the contents of the table written on device number nn on the IBM computers at ORNL, the proper JCL statement is

```
//GØ.FTnnF001 DD SYSØUT=A,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=1100)
```

In order to omit the table from the written output, however, the user substitutes the JCL statement

```
//GØ.FTnnF001 DD DUMMY
```

Omission of the listing of the tables of input data is particularly recommended when performing calculations for large numbers of radionuclides, because of the considerable length of these tables.

SUBROUTINE DATIN reads the input radioactive decay data for each radionuclide in formats described in Sect. 3.3 and returns to the main program an index denoting detection of the end-of-file following the data for the last radionuclide.

SUBROUTINE DATOUT controls writing of the five different data tables listing the radioactive decay data for each input radionuclide.

SUBROUTINE DATLIN, which is called by SUBROUTINE DATOUT, writes each line of the input radioactive decay data tables for the four different radiation types in an appropriate format.

SUBROUTINE CALC calculates body-surface and organ dose-rate factors for photons and controls the calculation of body-surface and skin dose-rate factors for electrons. For each radiation type and particular dose-rate factor, the basic scheme is to calculate the contribution to the dose-rate factor from each individual radiation in the spectrum and add all such contributions.

The first executable statements in the subroutine involve a series of calculations which are performed only once for each run of the program. These include the following: calculation of tissue-to-water mass energy-absorption coefficient ratios for photons and tissue-to-air and tissue-to-water mass stopping power ratios for electrons at 25 energies between 10 keV and 10 MeV; calculation of the minimum electron energies contributing to the electron dose-rate factors at the different depths of tissue in the dermis (front, midpoint, back, and at 70 μm) for the different exposure modes; definition of an array of equally spaced energies between 10 keV and 12 MeV for calculation of the continuous spectrum of electrons or positrons from beta decay; and, at alternate values of the energies for the beta spectra, calculation of tissue-to-air and tissue-to-water mass stopping power ratios, values of the scaling parameter α [see Eq. (48)], and values of the geometrical reduction factor G^t at the different depths of tissue in the dermis for air and water immersion [see Eq. (48)].

Following calculation of the so-called reference arrays described above, the various photon and electron dose-rate factors are calculated on the basis of the spectra of the various radiation types for the given radionuclide. The calculations for photons and discrete electrons are particularly simple, because the contribution from each radiation in the spectrum involves only a product of simple factors. Many of these factors for a given energy are obtained by means of quadratic interpolation of values in reference arrays. Contributions to the dose-rate factors from electrons from beta decay require an integration over the continuous spectrum from zero energy to the end-point energy for each separate transition and, for ground-surface exposure, an integration over the ground plane [see Eqs. (64)-(67)]. Integration over the continuous electron spectrum from beta decay is performed by summing the contributions from successive 20-keV wide energy bins between zero energy and the end-point energy. At each of these energies, the quantity $N_{j\beta}(E)$ describing the beta spectrum is calculated by calling the subroutine BSPEC. For ground surface exposure, the integral over the ground surface for a given energy, which is given by the quantity $\Omega(z,E)$ in Eq. (52) and denoted by the variable EINT in the code, is calculated by the subroutine BGRND.

The last section of this subroutine calculates the electron dose-rate factor averaged over the thickness of the dermis from the values at the front, midpoint, and back obtained previously. If the dose-rate factor at the back of the dermis is non-zero, the average over the dermis is obtained using Simpson's rule; otherwise, the location in the dermis where the dose-rate factor becomes zero is estimated, and the average value over the thickness of the dermis is obtained from a trapezoidal or triangle rule. Because of the few thicknesses in tissue at which the dose-rate factors are calculated, estimation of the values averaged over the thickness of the dermis cannot be regarded as a rigorously accurate procedure. The purpose of these approximate calculations is mainly to provide a comparison with the dose-rate factors calculated for the single depth of 70 μm in tissue.

YINTER is a single precision version of the double precision function YLAG[23] and performs Lagrangian interpolation in an array of function values depending on a single variable.

G, which is called by SUBROUTINE CALC, calculates the electron geometrical reduction factor including the leakage correction factor[7] for a given electron energy and distance in tissue from the body surface (see Sect. 2.3.2). The function subprogram also requires as input an array of electron ranges in tissue as a function of energy. The geometrical reduction factor is calculated by means of cubic interpolation in a two-dimensional reference array of values at 21 scaled distances in tissue and 25 energies. Values of parameters which are functions of a single variable are obtained by quadratic interpolation of values in reference arrays.

FAC, which is called by SUBROUTINE CALC, calculates the ratio of organ dose rate for photons to the dose rate in an infinite atmospheric cloud for a given organ and photon energy. Photon dose-rate factors are calculated for 24 body organs: adrenals, bladder, brain, breast, heart, small intestine, upper large intestine, lower large intestine, kidneys, liver, lungs, marrow, red marrow, ovaries, pancreas, skeleton, skin, spleen, stomach, testes, thymus, thyroid, uterus, and total body. Calculations for adrenals, brain, breast, and heart were not included in refs. 1 and 2, whereas previous calculations for yellow marrow and muscle are not included here. Because of the large range of values of organ dose-rate factors between 10 keV and 10 MeV, the desired ratio for a given organ is obtained by means of cubic interpolation of the logarithms of ratios as a function of energy given in a reference array.

E1 calculates first-order exponential integrals using polynomial and rational approximations given by Eqs. 5.1.53 and 5.1.56 of ref. 24.

SUBROUTINE BSPEC, which is called by SUBROUTINE CALC, calculates the energy spectrum of continuous electrons from beta decay, denoted in this report by $N_{j\beta}(E)$, multiplied by the total transition intensity $f_{j\beta}$. The subroutine requires as input the end-point energy and intensity for the beta transition, an array of energies at which the spectrum is to be calculated, the atomic number of the parent radionuclide, and an index specifying whether the transition produces negative electrons or positrons and whether the transition is allowed or first-forbidden unique.[25,26]

A rigorous calculation of the energy distribution function from beta decay can be a formidable task requiring extensive calculations (e.g., see ref. 9), and such calculations would be prohibitively expensive for the large number of beta transitions of concern for this report. In this subroutine, we have used an approximation to the beta spectrum given by Evans[26] which considerably simplifies the calculation and yields adequate numerical accuracy.

The energy distribution function, properly normalized according to Eq. (7), can be written as[25]

$$N_{j\beta}(E) = \frac{f_0(E)\ f_1(E)\ f_C(Z,E)}{\int_0^{E_{j\beta}^{max}} f_0(E)\ f_1(E)\ f_C(Z,E)\ dE} \quad , \tag{70}$$

where

$f_0(E)$ = statistical factor for allowed transition,

$f_1(E)$ = correction factor for first-forbidden unique transition,

$f_C(Z,E)$ = correction factor for Coulomb interaction,

Z = atomic number of daughter nucleus,

$E_{j\beta}^{max}$ = end-point energy for jth continuous spectrum.

Because of the small rest mass of the electron compared with typical total transition energies, relativistic relationships must be used for the different factors in Eq. (70).

The statistical factor for an allowed transition is given by[25,26]

$$f_0 = \eta W(W^{max} - W)^2 \quad , \tag{71}$$

where

W = electron total energy,

η = electron momentum,

W^{max} = electron total energy for end-point of spectrum.

In terms of the electron kinetic energy E in MeV and the rest mass energy of 0.511 MeV, the total energy and momentum are given by

$$W = E/0.511 + 1 \quad , \tag{72}$$

$$\eta = (W^2 - 1)^{1/2} \quad . \tag{73}$$

The correction factor for a first-forbidden unique transition is given by

$$f_1 = \eta^2 + (W^{max} - W)^2 \quad . \tag{74}$$

For allowed transitions or forbidden transitions other than first-forbidden unique, the quantity f_1 is taken to be 1.

The useful approximation to the energy distribution function involves the relativistic Coulomb correction factor, which can be written as[26]

$$f_C = \eta^{2s} e^{\pi y} \, |\Gamma(1+s+iy)|^2 \quad , \tag{75}$$

where

$$s = [1 - (Z/137)^2]^{1/2} - 1 \quad , \tag{76}$$

$$y = \pm ZW/137\eta \quad , \tag{77}$$

and Γ is the complex gamma function. The sign of the quantity y is + for β^- decay and - for β^+ decay.

For a particular beta transition, the spectrum given by Eq. (70) is calculated every 20 keV between zero energy and the end-point energy. The integral in the denominator in this equation is estimated using the trapezoidal rule.

Comparisons of the approximate methods used here with more rigorous calculations indicate that the present methods yield energy distribution functions which are accurate within 1%.

SUBROUTINE BGRND, which is called by SUBROUTINE CALC, calculates the integral over the ground surface of the electron scaled point kernel in air for a given electron energy and distance above ground [i.e., the quantity $\Omega(z,E)$ in eq. (52)]. The subroutine also requires as input an array of electron ranges in air at 25 energies between

10 keV and 10 MeV. The subroutine returns the value of the desired integral and the value of the electron range in air at the given energy.

Most of the statements in the subroutine are executed only once for each run of the program. This part of the subroutine involves calculation of a two-dimensional reference array of the desired integrals for the given height above ground. The reference array is calculated for 25 energies between 10 keV and 10 MeV and for 25 values of the lower limit of integration in Eq. (52) between 0.0 and 1.20. The scaled point kernels in air appearing in the integrand are calculated using Eq. (54) and two-dimensional cubic interpolations in a reference array of scaled point kernels in water. The two-dimensional reference array of integrals is then calculated using Simpson's rule.

With each call of the subroutine, the value of the integral in Eq. (52) for a given energy and distance above ground is obtained by means of a two-dimensional cubic interpolation of values in the reference array of integrals described above.

DINTER is a single precision version of the double precision function DLAG[23] and performs Lagrangian interpolation in an array of function values depending on two variables.

SUBROUTINE INTER is an interpolation routine in one dimension[23] used by DINTER.

DCGAM calculates gamma functions of a complex argument using the power series expansion

$$1/\Gamma(z) = \sum_k c_k z^k \quad , \tag{78}$$

where the coefficients c_k are given in Eq. 6.1.34 of ref. 27. While Eq. (78) is accurate for the range of values of the argument of the gamma function in Eq. (75) encountered in these calculations, we caution that the power series expansion does not converge for arbitrary values of the argument.

SUBROUTINE DOSOUT writes the dose-rate factors for photons and electrons in the appropriate tables and also produces the output on punched cards. The formats for the punched card output are described in Sect. 3.4.

3.2 Data Libraries

In order to calculate the photon and electron dose-rate factors, values of several energy-dependent parameters are required for each radiation in the spectrum from a particular radionuclide. The DOSFACTER computer code calculates these quantities by interpolation from reference arrays of the parameters as a function of energy contained in data statements in various subroutines in the program. This section describes the data libraries contained in the code.

SUBROUTINE CALC contains reference values of the following parameters at 25 energies between 10 keV and 10 MeV: photon mass energy-absorption coefficients in air, water, and tissue, and mass attenuation coefficients in air;[6,11,28] the ratio of photon mass energy absorption coefficients in tissue to the values in air averaged over the spectrum of photons in air from monoenergetic sources in an infinite, uniformly contaminated atmospheric cloud;[10] electron mass stopping powers in air, water, and tissue, and electron ranges in air;[19] and Berger C and D coefficients for photon energy-absorption buildup factors in air obtained from a linear least-squares fit of Eq. (25) to published buildup factors.[29,30] The subroutine also contains values of the electron scaling parameter α [see Eq. (48)] at 8 energies between 10 keV and 2 MeV.[7]

The function subprogram G contains a two-dimensional reference array of electron geometrical reduction factors G^t for air and water immersion (see Sect. 2.3.2) for 25 energies between 10 keV and 10 MeV and 21 values of the distance in tissue from the body surface divided by the electron range in tissue between 0.0 and 1.00 (ref. 8). The function subprogram also contains reference arrays of the leakage correction parameters q_1 and a [see Eq. (44)] for 17 energies between 20 keV and 4 MeV and a reference array of the leakage correction parameter q_2 for 15 values of the scaled distance between 0.0 and 1.00 (ref. 7).

The function subprogram FAC contains a two-dimensional reference array giving the ratio of photon dose rate in body organs to the dose rate in an infinite uniformly contaminated atmospheric cloud.[13] The ratios are given for 24 body organs and 15 energies between 10 keV and 10 MeV.

SUBROUTINE BGRND contains a two-dimensional reference array of electron scaled point kernels in water [see Eq. (50)] for 25 values of the distance divided by electron range between 0.0 and 1.20 and for 25 energies between 10 keV and 10 MeV.[8] The subroutine also contains a reference array of the scaling parameter α' [see Eq. (54)] for converting scaled point kernels in water to values in air at 8 energies between 10 keV and 2 MeV.[7]

3.3 Description of Input

The card input for the DOSFACTER computer code is divided into 11 card sets. The description for each card set given below contains the input variables in the order in which they are entered, the FORTRAN format, the definitions of the variables, and directions and restrictions for use of the card set.

We note that Card Sets 2 and 3 of the input data apply to the spectrum of alpha particles from the particular radionuclide of interest, even though these radiations are not relevant to external dosimetry. The reason for including the alpha radiations as input to the code is that the radionuclide data file in the formats listed below is also used as input to other computer codes in which these radiations are needed, such as calculations of internal dose following inhalation or ingestion of radionuclides. The alpha particle data are not further used by the DOSFACTER computer code following input.

Card Set 1: INUCL, THALF, ATNO - 2A4, 2X, 3A4, 3X, F5.1

INUCL - Radionuclide name

THALF - Radionuclide half-life

ATNO - Atomic number of radionuclide

The radionuclide name and half-life are used only for identification purposes and can be entered in any form desired by the user.

Card Set 2: NALF - I4

NALF - Number of alpha particles (limit of 20)

Card Set 3: (EALF(J), FALF(J), J=1,NALF) - 6E11.4

EALF(J) - Energy in MeV for jth alpha particle

FALF(J) - Intensity in number per decay for jth alpha particle

Card Set 4: NBETA, NFB, (NBF(I), I=1,NFB) - 7I4

NBETA - Number of continuous beta particles (limit of 50)

NFB - Number of first-forbidden unique transitions (limit of 5)

NBF(I) - Index for ith first-forbidden unique transition; value is the same as the index J for the particular transition on Card Set 5

If NBETA = 0, go to Card Set 6.

Card Set 5: (EBMAX(J), EBAVG(J), FBETA(J), J=1,NBETA) - 6E11.4

EBMAX(J) - End-point energy in MeV for jth continuous beta particle

EBAVG(J) - Average energy in MeV for jth continuous beta particle

FBETA(J) - Intensity in number per decay for jth continuous beta particle

Card Set 6: NPOS, NFP, (NPF(I), I=1,NFP) - 4I4

NPOS - Number of positrons (limit of 5)

NFP - Number of first-forbidden unique transitions (limit of 2)

NPF(I) - Index for ith first-forbidden unique transition; value is the same as the index J for the particular transition on Card Set 7

If NPOS = 0, go to Card Set 8.

Card Set 7: (EPMAX(J), EPAVG(J), FPOS(J), J=1,NPOS) - 6E11.4

EPMAX(J) - End-point energy in MeV for jth positron

EPAVG(J) - Average energy in MeV for jth positron

FPOS(J) - Intensity in number per decay for jth positron

Card Set 8: NELEC - I4

NELEC - Number of discrete Auger and internal conversion electrons (limit of 125)

If NELEC = 0, go to Card Set 10.

Card Set 9: (EELEC(J), FELEC(J), J=1,NELEC) - 6E11.4

EELEC(J) - Energy in MeV for jth Auger or internal conversion electron

FELEC(J) - Intensity in number per decay for jth Auger or internal conversion electron

Card Set 10: NGAM - I4

NGAM - Number of photons (limit of 200)

If NGAM = 0, either go to Card Set 1 to input data for a new radionuclide or enter an end-of-file to terminate program.

Card Set 11: (EGAM(J), FGAM(J), J=1,NGAM) - 6E11.4

EGAM(J) - Energy in MeV for jth photon

FGAM(J) - Intensity in number per decay for jth photon

Go to Card Set 1 to input data for a new radionuclide or enter an end-of-file to terminate program.

The DOSFACTER computer code performs a complete set of dose-rate factor calculations for a given radionuclide before reading the input data for the next radionuclide. The code thus does not provide for storage of large amounts of radionuclide data in the computer, with a consequent reduction in core storage requirements.

3.4 Description of Output

The printed output from the DOSFACTER computer code consists of a sequence of tables which can be divided into two parts. The first set of tables gives the input radioactive decay data for each radionuclide, and the second set gives the calculated external dose-rate factors for photons and electrons.

The input data for the radionuclides are listed in the first five tables. The first table gives the number of radiations of each of the types: betas (continuous negative electrons), positrons, (discrete) electrons, and photons emitted by each radionuclide. The next four tables give the energies and intensities of each radiation for the four different types.

The remaining eighteen tables give the calculated dose-rate factors, six tables for each exposure mode. The tables are ordered by exposure mode, with all results for immersion in contaminated air given first, followed by immersion in contaminated water, and finally exposure to a contaminated ground surface. For each exposure mode, the tables are ordered as follows: dose-rate factors at the body surface for photons, electrons, and the sum of the two; three tables of organ dose-rate factors for photons; electron dose-rate factors for the skin including the front, midpoint, and back of the dermis, the average over the thickness of the dermis, and the value at a depth of 70 μm from the body surface; and dose-rate factors for the skin for photons, electrons, and the sum of the two, with the electron value corresponding to a depth of 70 μm. The output formats are shown by the tables given in Appendix B. The tables of organ dose-rate factors for photons in Appendix B have been arranged in a more convenient sequence than those written by the program.

For each input radionuclide, the DOSFACTER computer code also produces punch-card output of the calculated dose-rate factors. This output is described below in the same manner as the input to the program was described in Sect. 3.3.

Card Set 1: INUCL, THALF - 2A4, 2X, 3A4

INUCL - Radionuclide name

THALF - Radionuclide half-life

Card Set 2: DOSE(1), DOSE(4), DOSE(7) - 3(1PE10.2)

DOSE(1) - Photon dose-rate factor for body surface for air immersion

DOSE(4) - Electron dose-rate factor for body surface for air immersion

DOSE(7) - Sum of photon and electron dose-rate factors for body surface for air immersion

Card Set 3: DOSE(2), DOSE(5), DOSE(8) - 3(1PE10.2)

DOSE(2) - Photon dose-rate factor for body surface for water immersion

DOSE(5) - Electron dose-rate factor for body surface for water immersion

DOSE(8) - Sum of photon and electron dose-rate factors for body surface for water immersion

Card Set 4: DOSE(3), DOSE(6), DOSE(9) - 3(1PE10.2)

DOSE(3) - Photon dose-rate factor for body surface for ground-surface exposure

DOSE(6) - Electron dose-rate factor for body surface for ground-surface exposure

DOSE(9) - Sum of photon and electron dose-rate factors for body surface for ground-surface exposure

Card Set 5: (DOSORG(1,J), J=1,24) - 8(1PE10.2)

DOSORG(1,J) - Photon dose-rate factor for jth organ for air immersion

Card Set 6: (DOSORG(2,J), J=1,24) - 8(1PE10.2)

DOSORG(2,J) - Photon dose-rate factor for jth organ for water immersion

Card Set 7: (DOSORG(3,J), J=1,24) - 8(1PE10.2)

DOSORG(3,J) - Photon dose-rate factor for jth organ for ground-surface exposure

Card Set 8: (DOSORB(1,J), J=1,3), DOSORB(1,5), DOSORB(1,4) - 5(1PE10.2)

DOSORB(1,J) - Electron dose-rate factor for front, midpoint, and back of dermis; value averaged over thickness of dermis; and value at depth of 70 μm for air immersion

Card Set 9: (DOSORB(2,J), J=1,3), DOSORB(2,5), DOSORB(2,4) - 5(1PE10.2)

DOSORB(2,J) - Electron dose-rate factor for front, midpoint, and back of dermis; value averaged over thickness of dermis; and value at depth of 70 μm for water immersion

Card Set 10: (DOSORB(3,J), J=1,3), DOSORB(3,5), DOSORB(3,4) - 5(1PE10.2)

DOSORB(3,J) - Electron dose-rate factor for front, midpoint, and back of dermis; value averaged over thickness of dermis; and value at depth of 70 μm for ground-surface exposure

Card Set 11: DOSORG(1,17), DOSORB(1,4), DOSSKN(1) - 3(1PE10.2)

DOSORG(1,17) - Photon dose-rate factor for skin for air immersion

DOSORB(1,4) - Electron dose-rate factor for skin (depth of 70 μm) for air immersion

DOSSKN(1) - Sum of photon and electron dose-rate factors for skin for air immersion

Card Set 12: DOSORG(2,17), DOSORB(2,4), DOSSKN(2) - 3(1PE10.2)

DOSORG(2,17) - Photon dose-rate factor for skin for water immersion

DOSORB(2,4) - Electron dose-rate factor for skin (depth of 70 μm) for water immersion

DOSSKN(2) - Sum of photon and electron dose-rate factors for skin for water immersion

Card Set 13: DOSORG(3,17), DOSORB(3,4), DOSSKN(3) - 3(1PE10.2)

DOSORG(3,17) - Photon dose-rate factor for skin for ground-surface exposure

DOSORB(3,4) - Electron dose-rate factor for skin (depth of 70 μm) for ground-surface exposure

DOSSKN(3) - Sum of photon and electron dose-rate for skin for ground-surface exposure

On Card Sets 5, 6, and 7, the order of the organs is the same as given with the description of subroutine FAC in Sect. 3.1 and in the output tables in Appendix B.

3.5 Job Control Language

This section provides documentation for the Job Control Language used to execute the DOSFACTER computer code on the IBM computers at the ORNL Computer Center. The listing given below assumes that both the FORTRAN program and the input data are read in from cards.

```
Card No.  Listing

   1      //DCKD JØB (XXXXX), 'X-10 7509 KØCHER'
   2      //*CLASS CPU91=20M,PRINT=20,PUNCH=100,REGIØN=270K,IØ=3.0
   3      // EXEC FØRTHCLG,PARM.GØ='EU=-1',REGIØN.GØ=270K
   4      //FØRT.SYSIN DD *
          (FORTRAN program)
   5      /*
   6      //GØ.FT07F001 DD SYSØUT=B
```

```
 7-11    //GØ.FTnnF001 DD DUMMY
12-29    //GØ.FTnnF001 DD SYSØUT=A,DCB=(RECFM=VBA,LRECL=137,
         BLKSIZE=1100)
   30    //GØ.FT05F001 DD *
         (Input data)
   31    /*
   32    //
```

On Card 1, XXXXX is a five-digit charge number. The specifications on Card 2 are sufficient to perform the calculations for all 500 radionuclides tabulated in this report. On Cards 7-11, the output device numbers nn are 10-14. These devices are for listing the input radioactive decay data, and the listing of these tables on the line printer is suppressed. On Cards 12-29, the output device numbers are 15-32. These devices are for listing all tables of dose-rate factors on the line printer.

The input radioactive decay data are also available on tape at the ORNL computer center. In order to read the input data from this tape, Card 30 is replaced by the following:

```
//GØ.FT05F001 DD UNIT=TAPE8,DISP=(ØLD,PASS),
// VØL=SER=X03739,
// LABEL=(1,SL),
// DSN=DECAY.DATA,
//    DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200,DEN=2)
```

In addition, Card 2 above should include SPECIAL=TAPE. Data for selected radionuclides can be read from the same tape if the user supplies a program to select only those radionuclides of interest.

4. CALCULATION OF EXTERNAL DOSE-RATE FACTORS

In addition to presenting a derivation of the external dose-rate factor equations and providing documentation of the revised DOSFACTER computer code, the purpose of this report is to provide a tabulation of dose-rate factors for photons and electrons for approximately 500 radionuclides of potential importance in environmental radiological assessments. The radionuclides chosen include those of potential importance in routine or accidental releases from nuclear fuel cycle facilities, those occurring naturally in the environment, those of current interest in nuclear medicine and fusion reactor technology, and a selection of those of interest to Committee 2 of the ICRP for the estimation of annual limits of intake and derived air concentrations for occupationally exposed individuals. The energies and intensities of the various photon and electron radiations used to calculate the dose-rate factors for each radionuclide were obtained from a recent compilation of evaluated nuclear decay data.[4]

The dose-rate conversion factors for the radionuclides considered in this report are tabulated in Appendix B. In applying these results to environmental radiological assessments, it is very important for the user to note that for a given radionuclide the tabulated dose-rate factors do not include any possible contributions from radioactive daughter products. Rather, a separate listing of dose-rate factors for all daughter products is included in the tables. Thus, for example, the photon dose-rate factors for ^{137}Cs are all zero, because all photon radiations actually occur as a result of the decay of the radioactive ^{137m}Ba daughter product. In this particular case, it is probably reasonable to assume that ^{137m}Ba will be in secular equilibrium with ^{137}Cs at any location in the environment and at any time, so that the dose-rate factors for the daughter can be multiplied by the known decay branching ratio[4] and added to the values for the parent. For many other radionuclides producing radioactive daughter products, however, it is not reasonable to assume secular equilibrium between parent and daughter. In these cases, the dose-rate factors can be combined only after due consideration of the laws describing buildup and decay of radioactive daughter products with time[4] and differences in environmental transport between the parent and daughters. Thus, it seems sensible to maintain separate listings of the dose-rate factors for all daughter products of a given parent.

5. CONCLUSION

This report has presented a tabulation of calculated external dose-rate conversion factors for approximately 500 radionuclides of potential importance in environmental radiological assessments. These dose-rate factors are useful in radiological assessments, because multiplication by a known radionuclide concentration in the environment gives the dose-equivalent rate for a given radiation type, mode of exposure, and body organ.

This report also gives a complete documentation of the models and equations used to calculate the dose-rate factors and of the revised DOSFACTER computer code which performed the calculations. The results given in this report incorporate two major modifications and additions to the dose-rate factors published from the original version of the code:[1,2] (1) calculation of electron dose-rate factors for radiosensitive tissues of the skin and (2) improved organ dose-rate factors for photons. The improved photon dose-rate factors are generally less for all photon energies than the values used previously. This is particularly the case for red marrow dose-rate factors below about 200 keV, where the new values are as much as an order of magnitude less than the old as the result of a more appropriate model for describing the shielding of bone marrow by bone.

The presentation of the dose-rate factor equations in this report has also emphasized the uncertainties and limitations inherent in the application of the results to environmental radiological assessments. An important limitation is that the dose-rate factors are based on the idealized and simplified assumptions that the source region is effectively semi-infinite or infinite in extent and that the radionuclide concentration is uniform throughout the source region. Because of the relatively short range of electrons from radioactive decay in air or water, it is likely that the idealized exposure conditions are reasonably well realized in actual exposures of a population. Because of the relatively long mean-free-path for high-energy photons in air, however, the idealized photon dose-rate factors for air immersion and ground-surface exposure will not always be applicable to the actual exposure conditions, and the user must bear this in mind when applying the results given in this report. The photon and electron dose-rate factors for ground-surface exposure may also be subject to considerable uncertainty, due to the fact that the angular and energy distributions of the radiations in air above ground are not the same as the distributions in an infinite, uniformly contaminated atmospheric cloud and due to the assumption that the dose-rate factors can be based on a single height of 1 m above ground. Possible errors in the dose-rate factors due to these effects are largely unknown.

In spite of the numerous approximations and simplifying assumptions used in obtaining the dose-rate factors given in this report, it seems likely that the results can be used extensively in environmental radiological assessments, particularly for exposure conditions in which the dose-rate factors are expected to provide conservative overestimates of dose, primarily because more realistic calculations are considerably more difficult. In addition, it should be realized that for many exposure situations the uncertainty in estimated dose-equivalent rates from external exposure is probably dominated by the uncertainty in the assumed radionuclide concentrations in the environment as a function of time and location.

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APPENDIX A

LISTING OF THE DOSFACTER COMPUTER CODE

A listing of the revised DOSFACTER computer code is given on the following pages. The subroutines and function subprograms are listed in the same order as they are described in Sect. 3.1.

```
C
C PROGRAM DOSFACTER (DOSE FACTORS FOR EXTERNAL RADIATION)
C
C A PROGRAM TO CALCULATE DOSE-RATE CONVERSION FACTORS FOR EXTERNAL EXPOSURE TO
C   PHOTONS AND ELECTRONS VIA IMMERSION IN CONTAMINATED AIR, IMMERSION IN
C   CONTAMINATED WATER, AND IRRADIATION FROM A CONTAMINATED GROUND SURFACE
C
C THIS VERSION OF THE PROGRAM INCLUDES CALCULATION OF ELECTRON DOSE-RATE FACTORS
C   FOR SKIN AND THE REVISED ORGAN DOSE-RATE FACTORS FOR PHOTONS
C
C PROGRAM AUTHOR:  D. C. KOCHER
C                  TECHNOLOGY ASSESSMENTS SECTION
C                  HEALTH AND SAFETY RESEARCH DIVISION
C                  OAK RIDGE NATIONAL LABORATORY
C DATE:  NOVEMBER 1980
C
C
C INITIALIZE INDEX FOR DETECTION OF END-OF-FILE FOR INPUT DATA
C
      NQUIT=0
C
C WRITE HEADINGS FOR EACH TABLE OF OUTPUT
C
      CALL PRINT (0)
C
C PERFORM A COMPLETE SET OF CACULATIONS FOR ONE RADIONUCLIDE AT A TIME
C
C   READ INPUT DATA
C
    1 CALL DATIN (NQUIT)
C
C   TEST FOR END-OF-FILE FOR INPUT DATA TO END CALCULATIONS
C
      IF (NQUIT .NE. 0) GO TO 2
C
C   WRITE INPUT DATA
C
      CALL DATOUT
C
C   CALCULATE DOSE-RATE CONVERSION FACTORS
C
      CALL CALC
C
C   WRITE DOSE-RATE CONVERSION FACTORS
C
      CALL DOSOUT
      GO TO 1
    2 STOP
      END
```

```
C
      SUBROUTINE PRINT (NTYPE)
C
C WRITES HEADINGS FOR EACH TABLE OF OUTPUT
C
C   NTYPE - INDEX FOR EACH TYPE OF TABLE
C         = 0 FOR FIRST TIME THROUGH SUBROUTINE WHEN ALL TABLE HEADINGS ARE
C              WRITTEN
C         = 1 TO WRITE RADIONUCLIDE AND SPECTRAL IDENTIFICATION TABLE HEADINGS
C              ONLY
C         = 2 TO WRITE BETA-PARTICLE DATA TABLE HEADINGS ONLY
C         = 3 TO WRITE POSITRON DATA TABLE HEADINGS ONLY
C         = 4 TO WRITE AUGER AND INTERNAL CONVERSION ELECTRON DATA TABLE
C              HEADINGS ONLY
C         = 5 TO WRITE PHOTON DATA TABLE HEADINGS ONLY
C         = 6 TO WRITE BODY-SURFACE DOSE-RATE CONVERSION FACTOR TABLE HEADINGS
C              ONLY
C         = 7 TO WRITE ORGAN DOSE-RATE CONVERSION FACTOR TABLE HEADINGS FOR
C              PHOTONS ONLY
C         = 8 TO WRITE SKIN DOSE-RATE CONVERSION FACTOR TABLE HEADINGS FOR
C              ELECTRONS ONLY
C         = 9 TO WRITE SKIN DOSE-RATE CONVERSION FACTOR TABLE HEADINGS FOR
C              PHOTONS, ELECTRONS, AND SUM OF THE TWO
C
      IF (NTYPE .EQ. 0) GO TO 1
      GO TO (1, 2, 3, 4, 5, 6, 7, 8, 9), NTYPE
C
C RADIONUCLIDE AND SPECTRAL IDENTIFICATION
C
    1 WRITE (10,10)
   10 FORMAT (1H1)
      WRITE (10,20)
   20 FORMAT (1H0, 2X, 40HRADIONUCLIDE AND SPECTRAL IDENTIFICATION)
      WRITE (10,21)
   21 FORMAT (1H0, 42X, 24HNUMBER OF SPECTRAL LINES)
      WRITE (10,22)
   22 FORMAT (1H , 34X, 39H-------------------- ------------------)
      WRITE (10,23)
   23 FORMAT (1H , 5X, 7HNUCLIDE, 8X, 9HHALF-LIFE, 5X, 5HBETAS, 4X,
     2 9HPOSITRONS, 2X, 9HELECTRONS, 3X, 7HPHOTONS/)
      IF (NTYPE .NE. 0) GO TO 99
C
C BETA-PARTICLE DATA
C
    2 WRITE (11,10)
      WRITE (11,24)
   24 FORMAT (1H0, 2X, 47HENERGIES AND INTENSITIES FOR EACH BETA PARTICL
     2E)
      WRITE (11,25)
   25 FORMAT (1H0, 36X, 7HMAXIMUM, 9X, 7HAVERAGE, 9X, 9HINTENSITY)
      WRITE (11,26)
   26 FORMAT (1H , 5X, 7HNUCLIDE, 8X, 9HHALF-LIFE, 5X, 12HENERGY (MEV),
     2 4X, 12HENERGY (MEV), 5X, 11H(PER DECAY))
      IF (NTYPE .NE. 0) GO TO 99
C
C POSITRON DATA
```

```
C
    3 WRITE (12,10)
      WRITE (12,27)
   27 FORMAT (1HO, 2X, 42HENERGIES AND INTENSITIES FOR EACH POSITRON)
      WRITE (12,25)
      WRITE (12,26)
      IF (NTYPE .NE. 0) GO TO 99
C
C AUGER AND INTERNAL CONVERSION ELECTRON DATA
C
    4 WRITE (13,10)
      WRITE (13,28)
   28 FORMAT (1HO, 2X, 72HENERGIES AND INTENSITIES FOR EACH AUGER AND IN
     2TERNAL CONVERSION ELECTRON)
      WRITE (13,29)
   29 FORMAT (1HO, 37X, 6HENERGY, 9X, 9HINTENSITY)
      WRITE (13,30)
   30 FORMAT (1H , 5X, 7HNUCLIDE, 8X, 9HHALF-LIFE, 9X, 5H(MEV), 8X,
     2 11H(PER DECAY))
      IF (NTYPE .NE. 0) GO TO 99
C
C PHOTON DATA
C
    5 WRITE (14,10)
      WRITE (14,31)
   31 FORMAT (1HO, 2X, 40HENERGIES AND INTENSITIES FOR EACH PHOTON)
      WRITE (14,29)
      WRITE (14,30)
      IF (NTYPE .NE. 0) GO TO 99
C
C BODY-SURFACE DOSE-RATE CONVERSION FACTORS
C
C    AIR IMMERSION
C
    6 WRITE (15,10)
      WRITE (15,32)
   32 FORMAT (1HO, 2X, 62HDOSE-RATE CONVERSION FACTORS FOR IMMERSION IN
     2CONTAMINATED AIR)
      WRITE (15,33)
   33 FORMAT (1HO, 5X, 68HDOSE RATE AT BODY SURFACE FOR AIR CONCENTRATIO
     2N OF 1 BQ PER CUBIC CM)
      WRITE (15,34)
   34 FORMAT (1HO, 38X, 6HPHOTON, 11X, 8HELECTRON, 12X, 5HTOTAL)
      WRITE (15,35)
   35 FORMAT (1H , 37X, 9HDOSE RATE, 9X, 9HDOSE RATE, 9X, 9HDOSE RATE)
      WRITE (15,36)
   36 FORMAT (1H , 5X, 7HNUCLIDE, 8X, 9HHALF-LIFE, 9X, 7H(SV/YR), 11X,
     2 7H(SV/YR), 11X, 7H(SV/YR)/)
C
C    WATER IMMERSION
C
      WRITE (21,10)
      WRITE (21,37)
   37 FORMAT (1HO, 2X, 64HDOSE-RATE CONVERSION FACTORS FOR IMMERSION IN
     2CONTAMINATED WATER)
      WRITE (21,38)
   38 FORMAT (1HO, 5X, 70HDOSE RATE AT BODY SURFACE FOR WATER CONCENTRAT
     2ION OF 1 BQ PER CUBIC CM)
```

```
      WRITE (21,34)
      WRITE (21,35)
      WRITE (21,36)
C
C   GROUND SURFACE EXPOSURE
C
      WRITE (27,10)
      WRITE (27,39)
   39 FORMAT (1H0, 2X, 79HDOSE-RATE CONVERSION FACTORS FOR EXPOSURE 1 M
     2ABOVE CONTAMINATED GROUND SURFACE)
      WRITE (27,40)
   40 FORMAT (1H0, 5X, 80HDOSE RATE AT BODY SURFACE FOR GROUND-SURFACE C
     2ONCENTRATION OF 1 BQ PER SQUARE CM)
      WRITE (27,34)
      WRITE (27,35)
      WRITE (27,36)
      IF (NTYPE .NE. 0) GO TO 99
C
C ORGAN DOSE-RATE CONVERSION FACTORS FOR PHOTONS
C
C   AIR IMMERSION
C
    7 WRITE (16,10)
      WRITE (16,41)
   41 FORMAT (1H0, 2X, 88HPHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOU
     2S ORGANS FOR IMMERSION IN CONTAMINATED AIR)
      WRITE (16,42)
   42 FORMAT (1H , 5X, 26HIN SV/YR PER BQ/(CUBIC CM))
      WRITE (16,43)
   43 FORMAT (1H0, 92X, 5HUPPER, 6X, 5HLOWER)
      WRITE (16,44)
   44 FORMAT (1H , 81X, 5HSMALL, 6X, 5HLARGE, 6X, 5HLARGE)
      WRITE (16,45)
   45 FORMAT (1H , 1X, 7HNUCLIDE, 4X, 9HHALF-LIFE, 3X, 8HADRENALS, 4X,
     2 7HBLADDER, 5X, 5HBRAIN, 5X, 6HBREAST, 6X, 5HHEART, 4X,
     3 9HINTESTINE, 2X, 9HINTESTINE, 2X, 9HINTESTINE)
      WRITE (17,10)
      WRITE (17,41)
      WRITE (17,42)
      WRITE (17,46)
   46 FORMAT (1H0, 71X, 3HRED)
      WRITE (17,47)
   47 FORMAT (1H , 1X, 7HNUCLIDE, 4X, 9HHALF-LIFE, 4X, 7HKIDNEYS, 5X,
     2 5HLIVER, 6X, 5HLUNGS, 5X, 6HMARROW, 5X, 6HMARROW, 5X, 7HOVARIES,
     3 3X, 8HPANCREAS, 3X, 8HSKELETON)
      WRITE (18,10)
      WRITE (18,41)
      WRITE (18,42)
      WRITE (18-60)
   60 FORMAT (1H0, 103X, 5HTOTAL)
      WRITE (18,61)
   61 FORMAT (1H , 1X, 7HNUCLIDE, 4X, 9HHALF-LIFE, 5X, 4HSKIN, 6X,
     2 6HSPLEEN, 5X, 7HSTOMACH, 4X, 6HTESTES, 5X, 6HTHYMUS, 5X,
     3 7HTHYROID, 4X, 6HUTERUS, 6X, 4HBODY)
C
C   WATER IMMERSION
C
      WRITE (22,10)
      WRITE (22,48)
   48 FORMAT (1H0, 2X, 90HPHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOU
     2S ORGANS FOR IMMERSION IN CONTAMINATED WATER)
      WRITE (22,42)
      WRITE (22,43)
      WRITE (22,44)
      WRITE (22,45)
      WRITE (23,10)
      WRITE (23,48)
      WRITE (23,42)
      WRITE (23,46)
      WRITE (23,47)
      WRITE (24,10)
      WRITE (24,48)
      WRITE (24,42)
      WRITE (24,60)
      WRITE (24,61)
C
C   GROUND SURFACE EXPOSURE
C
      WRITE (28,10)
      WRITE (28,49)
   49 FORMAT (1H0, 2X, 105HPHOTON DOSE-RATE CONVERSION FACTORS FOR VARIO
     2US ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE)
      WRITE (28,50)
   50 FORMAT (1H , 5X, 27HIN SV/YR PER BQ/(SQUARE CM))
      WRITE (28,43)
      WRITE (28,44)
      WRITE (28,45)
      WRITE (29,10)
      WRITE (29,49)
      WRITE (29,50)
      WRITE (29,46)
      WRITE (29,47)
      WRITE (30,10)
      WRITE (30,49)
      WRITE (30,50)
      WRITE (30,60)
      WRITE (30,61)
      IF (NTYPE .NE. 0) GO TO 99
C
C SKIN DOSE-RATE CONVERSION FACTORS FOR ELECTRONS
C
C   AIR IMMERSION
C
    8 WRITE (19,10)
      WRITE (19,51)
   51 FORMAT (1H0, 2X, 80HELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN
     2 FOR IMMERSION IN CONTAMINATED AIR)
      WRITE (19,42)
      WRITE (19,52)
   52 FORMAT (1H0, 37X, 8HFRONT OF, 9X, 11HMIDPOINT OF, 9X, 7HBACK OF,
     2 8X, 12HAVERAGE OVER, 8X, 8HDEPTH OF)
      WRITE (19,53)
   53 FORMAT (1H , 5X, 7HNUCLIDE, 8X, 9HHALF-LIFE, 9X, 6HDERMIS, 12X,
     2 6HDERMIS, 12X, 6HDERMIS, 12X, 6HDERMIS, 10X, 10H70 MICRONS/)
C
C   WATER IMMERSION
```

```
C
      WRITE (25,10)
      WRITE (25,54)
   54 FORMAT (1H0, 2X, 82HELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN
     2 FOR IMMERSION IN CONTAMINATED WATER)
      WRITE (25,42)
      WRITE (25,52)
      WRITE (25,53)
C
C   GROUND SURFACE EXPOSURE
C
      WRITE (31,10)
      WRITE (31,55)
   55 FORMAT (1H0, 2X, 97HELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN
     2 FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE)
      WRITE (31,50)
      WRITE (31,52)
      WRITE (31,53)
      IF (NTYPE .NE. 0) GO TO 99
C
C SKIN DOSE-RATE CONVERSION FACTORS FOR PHOTONS, ELECTRONS, AND TOTAL
C
C   AIR IMMERSION
C
    9 WRITE (20,10)
      WRITE (20,65)
   65 FORMAT (1H0, 2X, 71HDOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMME
     2RSION IN CONTAMINATED AIR)
      WRITE (20,42)
      WRITE (20,66)
   66 FORMAT (1H0, 5X, 56HVALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF
     270 MICRONS)
      WRITE (20,67)
   67 FORMAT (1H0, 5X, 7HNUCLIDE, 8X, 9HHALF-LIFE, 9X, 6HPHOTON, 11X,
     2 8HELECTRON, 12X, 5HTOTAL/)
C
C   WATER IMMERSION
C
      WRITE (26,10)
      WRITE (26,68)
   68 FORMAT (1H0, 2X, 73HDOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMME
     2RSION IN CONTAMINATED WATER)
      WRITE (26,42)
      WRITE (26,66)
      WRITE (26,67)
C
C   GROUND SURFACE EXPOSURE
C
      WRITE (32,10)
      WRITE (32,69)
   69 FORMAT (1H0, 2X, 88HDOSE-RATE CONVERSION FACTORS FOR SKIN FOR EXPO
     2SURE 1 M ABOVE CONTAMINATED GROUND SURFACE)
      WRITE (32,50)
      WRITE (32,66)
      WRITE (32,67)
   99 RETURN
      END
```

```
C
      SUBROUTINE DATIN (NQUIT)
C
C READS INPUT DATA FOR EACH NUCLIDE
C
C   NQUIT - AN INDEX TO DETECT END-OF-FILE FOLLOWING DATA FOR LAST NUCLIDE
C         = 0 INITIALLY
C         = 1 AT END-OF-FILE
C
      DIMENSION EALF(25), FALF(25), EBMAX(50), EBAVG(50), FBETA(50),
     2 EPMAX(20), EPAVG(20), FPOS(20), EELEC(125), FELEC(125),
     3 EGAM(200), FGAM(200)
      DIMENSION INUCL(2), THALF(3), NBF(5), NPF(5)
      COMMON/ BLK1/ INUCL, THALF
      COMMON/ BLK2/ ATNO, NFB, NBF, NFP, NPF
      COMMON/ BLK3/ NBETA, NPOS, NELEC, NGAM
      COMMON/ BLK4/ EBMAX, EBAVG, FBETA, EPMAX, EPAVG, FPOS, EELEC,
     2 FELEC, EGAM, FGAM
C
C RADIONUCLIDE NAME, HALF-LIFE, AND ATOMIC NUMBER
C
      READ (5,3,END=99) INUCL, THALF, ATNO
    3 FORMAT (2A4, 2X, 3A4, 3X, F5.1)
C
C NUMBER OF ALPHA PARTICLES (LIMIT OF 20); ALPHA ENERGIES AND INTENSITIES ARE
C   READ IN, BUT ARE NOT USED IN THE PROGRAM
C
      READ (5,4) NALF
    4 FORMAT (7I4)
      IF (NALF .EQ. 0) GO TO 9
C
C ALPHA ENERGIES IN MEV AND INTENSITIES IN NUMBER PER DECAY
C
      READ (5,6) (EALF(J), FALF(J), J=1,NALF)
    6 FORMAT (6E11.4)
C
C NUMBER OF BETA PARTICLES (LIMIT OF 50), NUMBER OF FIRST-FORBIDDEN UNIQUE
C   TRANSITIONS (LIMIT OF 5), AND INDEX FOR EACH FIRST-FORBIDDEN UNIQUE
C   TRANSITION
C
    9 READ (5,4) NBETA, NFB, (NBF(I), I=1,NFB)
      IF (NBETA .EQ. 0) GO TO 5
C
C BETA ENDPOINT AND AVERAGE ENERGIES IN MEV AND INTENSITIES IN NUMBER PER DECAY
C
      READ (5,6) (EBMAX(J), EBAVG(J), FBETA(J), J=1,NBETA)
C
C NUMBER OF POSITRONS (LIMIT OF 20), NUMBER OF FIRST-FORBIDDEN UNIQUE
C   TRANSITIONS (LIMIT OF 5), AND INDEX FOR EACH FIRST-FORBIDDEN UNIQUE
C   TRANSITION
C
    5 READ (5,4) NPOS, NFP, (NPF(I), I=1,NFP)
      IF (NPOS .EQ. 0) GO TO 7
C
C POSITRON ENDPOINT AND AVERAGE ENERGIES IN MEV AND INTENSITIES IN NUMBER PER
C   DECAY
```

```
C
      READ (5,6) (EPMAX(J), EPAVG(J), FPOS(J), J=1,NPOS)
C
C NUMBER OF AUGER AND INTERNAL CONVERSION ELECTRONS (LIMIT OF 125)
C
    7 READ (5,4) NELEC
      IF (NELEC .EQ. 0) GO TO 8
C
C AUGER AND INTERNAL CONVERSION ELECTRON ENERGIES IN MEV AND INTENSITIES IN
C   NUMBER PER DECAY
C
      READ (5,6) (EELEC(J), FELEC(J), J=1,NELEC)
C
C NUMBER OF PHOTONS (LIMIT OF 200)
C
    8 READ (5,4) NGAM
      IF (NGAM .EQ. 0) GO TO 1
C
C PHOTON ENERGIES IN MEV AND INTENSITIES IN NUMBER PER DECAY
C
      READ (5,6) (EGAM(J), FGAM(J), J=1,NGAM)
      GO TO 1
   99 NQUIT=1
    1 RETURN
      END
```

```
C
      SUBROUTINE DATOUT
C
C WRITES INPUT DATA FOR EACH NUCLIDE
C
      DIMENSION EBMAX(50), EBAVG(50), FBETA(50), EPMAX(20), EPAVG(20),
     2 FPOS(20), EELEC(125), FELEC(125), EGAM(200), FGAM(200)
      DIMENSION INUCL(2), THALF(3)
      COMMON/ BLK1/ INUCL, THALF
      COMMON/ BLK3/ NBETA, NPOS, NELEC, NGAM
      COMMON/ BLK4/ EBMAX, EBAVG, FBETA, EPMAX, EPAVG, FPOS, EELEC,
     2 FELEC, EGAM, FGAM
C
C MAXIMUM NUMBER OF LINES PER PAGE FOR EACH TYPE OF DATA TABLE
C
      DATA MAXLID/51/, MAXLSP/52/
C
      LOGICAL FIRST/ .TRUE./
C
C TEST FOR FIRST TIME THROUGH SUBROUTINE
C
      IF (.NOT. FIRST) GO TO 9
C
C INITIALIZE LINE COUNT FOR EACH TABLE; RESET LOGICAL VARIABLE
C
      LINID=0
      LINBET=0
      LINPOS=0
      LINEL=0
      LINGAM=0
      FIRST=.FALSE.
C
C RADIONUCLIDE AND SPECTRAL IDENTIFICATION
C
    9 WRITE (10,10) INUCL, THALF, NBETA, NPOS, NELEC, NGAM
   10 FORMAT (1H , 4X, 2A4, 5X, 3A4, 4X, I4, 3(7X, I4))
      LINID=LINID+1
      IF (LINID .LT. MAXLID) GO TO 11
      CALL PRINT (1)
      LINID=0
   11 IF (NBETA .EQ. 0) GO TO 12
C
C BETA-PARTICLE DATA
C
      CALL DATLIN (NBETA, EBMAX(1), EBAVG(1), FBETA(1), LINBET, MAXLSP,
     2 1, 11, 2)
      IF (NBETA .EQ. 1) GO TO 12
      DO 15 J=2,NBETA
      CALL DATLIN (NBETA, EBMAX(J), EBAVG(J), FBETA(J), LINBET, MAXLSP,
     2 J, 11, 2)
   15 CONTINUE
   12 IF (NPOS .EQ. 0) GO TO 18
C
C POSITRON DATA
C
      CALL DATLIN (NPOS, EPMAX(1), EPAVG(1), FPOS(1), LINPOS, MAXLSP, 1,
     2 12, 3)
      IF (NPOS .EQ. 1) GO TO 18
      DO 20 J=2,NPOS
      CALL DATLIN (NPOS, EPMAX(J), EPAVG(J), FPOS(J), LINPOS, MAXLSP, J,
     2 12, 3)
   20 CONTINUE
   18 IF (NELEC .EQ. 0) GO TO 21
C
C AUGER AND INTERNAL CONVERSION ELECTRON DATA
C
      CALL DATLIN (NELEC, EELEC(1), EELEC(1), FELEC(1), LINEL, MAXLSP,
     2 1, 13, 4)
      IF (NELEC .EQ. 1) GO TO 21
      DO 24 J=2,NELEC
      CALL DATLIN (NELEC, EELEC(J), EELEC(J), FELEC(J), LINEL, MAXLSP,
     2 J, 13, 4)
   24 CONTINUE
   21 IF (NGAM .EQ. 0) GO TO 26
C
C PHOTON DATA
C
      CALL DATLIN (NGAM, EGAM(1), EGAM(1), FGAM(1), LINGAM, MAXLSP, 1,
     2 14, 5)
      IF (NGAM .EQ. 1) GO TO 26
      DO 28 J=2,NGAM
      CALL DATLIN (NGAM, EGAM(J), EGAM(J), FGAM(J), LINGAM, MAXLSP, J,
     2 14, 5)
   28 CONTINUE
   26 RETURN
      END
```

```
C
      SUBROUTINE DATLIN (NPART, EMAX, EAVG, FINT, LINE, MAXLIN, NLINE,
   2 NPRINT, NTYPE)
C
C WRITES EACH LINE OF BETA-PARTICLE, POSITRON, AUGER AND INTERNAL CONVERSION
C    ELECTRON, OR PHOTON DATA
C
C    NPART - NUMBER OF SPECTRAL LINES OF PARTICULAR RADIATION TYPE
C    EMAX - ENDPOINT ENERGY OF PARTICULAR SPECTRAL LINE
C    EAVG - AVERAGE ENERGY OF PARTICULAR SPECTRAL LINE
C    FINT - INTENSITY OF PARTICULAR SPECTRAL LINE
C    LINE - LINE COUNT FOR DATA TABLE FOR PARTICULAR SPECTRAL LINE
C    MAXLIN - MAXIMUM LINE COUNT FOR DATA TABLE FOR PARTICULAR RADIATION TYPE
C    NLINE - INDEX FOR SPECTRAL LINE OF PARTICULAR RADIATION TYPE
C    NPRINT - OUTPUT DEVICE NUMBER
C    NTYPE - INDEX FOR RADIATION TYPE (SEE SUBROUTINE PRINT FOR LISTING)
C
      DIMENSION INUCL(2), THALF(3)
      COMMON/ BLK1/ INUCL, THALF
C
C TEST FOR FIRST SPECTRAL LINE OF PARTICULAR RADIATION TYPE
C
      IF (NLINE .NE. 1) GO TO 1
C
C WRITE FIRST SPECTRAL LINE
C
C    TEST FOR CONTINUOUS OR DISCRETE RADIATION
C
      IF (EMAX .EQ. EAVG) GO TO 2
C
C    BETA-PARTICLE OR POSITRON DATA
C
      WRITE (NPRINT,3) INUCL, THALF, EMAX, EAVG, FINT
    3 FORMAT (1H0, 4X, 2A4, 5X, 3A4, 7X, 2(F7.4, 9X), F8.5)
      GO TO 4
C
C    AUGER AND INTERNAL CONVERSION ELECTRON OR PHOTON DATA
C
    2 WRITE (NPRINT,5) INUCL, THALF, EMAX, FINT
    5 FORMAT (1H0, 4X, 2A4, 5X, 3A4, 7X, F7.4, 9X, F8.5)
    4 LINE=LINE+2
      GO TO 6
C
C WRITE SECOND AND SUBSEQUENT SPECTRAL LINES USING SAME PROCEDURE AS ABOVE
C
    1 IF (EMAX .EQ. EAVG) GO TO 7
      WRITE (NPRINT,8) EMAX, EAVG, FINT
    8 FORMAT (1H , 36X, 2(F7.4, 9X), F8.5)
      GO TO 9
    7 WRITE (NPRINT,10) EMAX, FINT
   10 FORMAT (1H , 36X, F7.4, 9X, F8.5)
    9 LINE=LINE+1
C
C TEST FOR END OF PAGE
C
    6 IF (LINE .LT. MAXLIN) GO TO 11
```

```
C
C WRITE TABLE HEADINGS ON NEW PAGE AND SKIP A LINE AFTER HEADINGS
C
      CALL PRINT (NTYPE)
      LINE=0
      IF (NLINE .EQ. 1 .AND. NPART .NE. 1) WRITE (NPRINT,13)
   13 FORMAT (1H )
      IF (NLINE .NE. 1 .AND. NLINE .NE. NPART) WRITE (NPRINT,13)
   11 RETURN
      END
```

```
C
      SUBROUTINE CALC
C
C CALCULATES DOSE-RATE CONVERSION FACTORS FOR EXTERNAL EXPOSURE TO PHOTONS AND
C   ELECTRONS
C
      DIMENSION EBMAX(50), EBAVG(50), FBETA(50), EPMAX(20), EPAVG(20),
     2 FPOS(20), EELEC(125), FELEC(125), EGAM(200), FGAM(200)
      DIMENSION NBF(5), NPF(5)
      DIMENSION ER(25), FMUEAR(25), FMUEWR(25), FMUETR(25), FMUAR(25),
     2 SPAR(25), SPWR(25), SPTR(25), RNAR(25), RNTR(25), CAR(25),
     3 DAR(25)
      DIMENSION EAR(8), ALPHAR(8), EARL(8), ZSKN(4), RSKN(4), RA(4),
     2 EMAW(4), EMGR(4), CPM(6)
      DIMENSION GTAR(25), GTWR(25), BTAR(25), BTWR(25)
      DIMENSION EBSR(1201), RTAR(600), RTWR(600), ALR(600), FIE(600)
      DIMENSION SGAORG(24), SGWORG(24), SGGORG(24), SBASKN(4),
     2 SBWSKN(4), SBGSKN(4)
      DIMENSION GFAC(4,600), ORGFAC(24)
      DIMENSION DOSE(9), DOSORG(3,24), DOSORB(3,5), DOSSKN(3)
      COMMON/ BLK2/ ATNO, NFB, NBF, NFP, NPF
      COMMON/ BLK3/ NBETA, NPOS, NELEC, NGAM
      COMMON/ BLK4/ EBMAX, EBAVG, FBETA, EPMAX, EPAVG, FPOS, EELEC,
     2 FELEC, EGAM, FGAM
      COMMON/ BLK5/ DOSE, DOSORG, DOSORB, DOSSKN
      DOUBLE PRECISION EI
C
C ENERGIES FOR REFERENCE VALUES OF PHOTON ENERGY-ABSORPTION COEFFICIENTS,
C   ATTENUATION COEFFICIENTS, BUILDUP FACTOR PARAMETERS, AND ORGAN DOSE-RATE
C   FACTORS; AND ELECTRON STOPPING POWERS AND RANGES--VALUES IN MEV
C
      DATA ER/      0.010,   0.015,   0.020,   0.030,   0.040,   0.050,
     2     0.060,   0.080,   0.100,   0.150,   0.200,   0.300,   0.400,
     3     0.500,   0.600,   0.800,     1.0,     1.5,     2.0,     3.0,
     4       4.0,     5.0,     6.0,     8.0,    10.0/
C
C REFERENCE VALUES OF PHOTON MASS ENERGY-ABSORPTION COEFFICIENTS IN AIR IN
C   (SQUARE CM)/G
C
      DATA FMUEAR/   4.61,    1.27,   0.511,   0.148,  0.0668,  0.0406,
     2    0.0305,  0.0243,  0.0234,  0.0250,  0.0268,  0.0287,  0.0295,
     3    0.0296,  0.0295,  0.0289,  0.0278,  0.0254,  0.0234,  0.0205,
     4    0.0186,  0.0174,  0.0164,  0.0152,  0.0145/
C
C REFERENCE VALUES OF PHOTON MASS ENERGY-ABSORPTION COEFFICIENTS IN WATER IN
C   (SQUARE CM)/G
C
      DATA FMUEWR/   4.79,    1.28,   0.512,   0.149,  0.0677,  0.0418,
     2    0.0320,  0.0262,  0.0256,  0.0277,  0.0297,  0.0319,  0.0328,
     3    0.0330,  0.0329,  0.0321,  0.0309,  0.0282,  0.0260,  0.0227,
     4    0.0206,  0.0191,  0.0180,  0.0166,  0.0157/
C
C REFERENCE VALUES OF PHOTON MASS ENERGY-ABSORPTION COEFFICIENTS IN TISSUE
C   (MUSCLE) IN (SQUARE CM)/G
C
      DATA FMUETR/   4.87,    1.32,   0.533,   0.154,  0.0701,  0.0431,
     2    0.0328,  0.0264,  0.0256,  0.0275,  0.0294,  0.0317,  0.0325,
     3    0.0328,  0.0325,  0.0318,  0.0308,  0.0282,  0.0259,  0.0226,
     4    0.0203,  0.0188,  0.0178,  0.0163,  0.0154/
C
C REFERENCE VALUES OF PHOTON MASS ATTENUATION COEFFICIENTS IN AIR IN
C   (SQUARE CM)/G
C
      DATA FMUAR/     4.99,    1.55,   0.752,   0.349,   0.248,   0.208,
     2     0.188,   0.167,   0.154,   0.136,   0.123,   0.107,  0.0954,
     3    0.0870,  0.0805,  0.0707,  0.0636,  0.0518,  0.0445,  0.0358,
     4    0.0308,  0.0275,  0.0252,  0.0223,  0.0204/
C
C REFERENCE VALUES OF PHOTON TISSUE-TO-AIR DOSE RATIO FOR IMMERSION IN
C   CONTAMINATED AIR; VALUES ARE RATIO OF MASS ENERGY-ABSORPTION COEFFICIENTS
C   AVERAGED OVER SPECTRUM OF PHOTONS IN AIR FROM MONOENERGETIC SOURCES AND ARE
C   OBTAINED FROM FIG.6 OF DILLMAN, HEALTH PHYSICS 27, 571 (1974).
C
      DATA GTAR/     0.954,   0.954,   0.956,   0.961,   0.973,   0.985,
     2     0.998,   1.018,   1.032,   1.054,   1.066,   1.076,   1.085,
     3     1.089,   1.091,   1.094,   1.096,   1.099,   1.100,   1.098,
     4     1.094,   1.090,   1.085,   1.076,   1.067/
C
C REFERENCE VALUES OF ELECTRON MASS STOPPING POWERS IN AIR IN (MEV-SQUARE CM)/G
C
      DATA SPAR/      19.7,    14.4,    11.6,    8.48,    6.84,    5.81,
     2      5.11,    4.20,    3.63,    2.86,    2.47,    2.09,    1.91,
     3      1.81,    1.75,    1.70,    1.68,    1.68,    1.71,    1.79,
     4      1.85,    1.91,    1.97,    2.07,    2.16/
C
C REFERENCE VALUES OF ELECTRON MASS STOPPING POWERS IN WATER IN
C   (MEV-SQUARE CM)/G
C
      DATA SPWR/      23.2,    16.9,    13.5,    9.88,    7.96,    6.75,
     2      5.92,    4.86,    4.20,    3.30,    2.85,    2.40,    2.19,
     3      2.07,    2.00,    1.93,    1.89,    1.88,    1.89,    1.93,
     4      1.97,    2.01,    2.05,    2.12,    2.18/
C
C REFERENCE VALUES OF ELECTRON MASS STOPPING POWERS IN TISSUE (MUSCLE) IN
C   (MEV-SQUARE CM)/G
C
      DATA SPTR/      22.9,    16.7,    13.4,    9.77,    7.86,    6.67,
     2      5.86,    4.80,    4.15,    3.27,    2.82,    2.38,    2.17,
     3      2.05,    1.98,    1.92,    1.89,    1.89,    1.92,    1.99,
     4      2.06,    2.13,    2.18,    2.28,    2.37/
C
C REFERENCE VALUES OF ELECTRON RANGES IN AIR IN G/(SQUARE CM)
C
      DATA RNAR/  2.89E-4, 5.90E-4, 9.81E-4, 2.01E-3, 3.33E-3, 4.92E-3,
     2   6.76E-3,  0.0111,  0.0163,  0.0320,  0.0509,  0.0954,   0.146,
     3     0.200,   0.256,   0.372,   0.491,   0.789,    1.08,    1.66,
     4      2.21,    2.74,    3.25,    4.24,    5.19/
C
C REFERENCE VALUES OF ELECTRON RANGES IN TISSUE IN G/(SQUARE CM)
C
      DATA RNTR/  2.47E-4, 5.06E-4, 8.44E-4, 1.73E-3, 2.88E-3, 4.27E-3,
     2   5.87E-3, 9.67E-3,  0.0142,  0.0279,  0.0445,  0.0836,   0.128,
     3     0.175,   0.225,   0.328,   0.433,   0.698,   0.960,    1.47,
     4      1.96,    2.44,    2.91,    3.80,    4.66/
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```
C
C REFERENCE VALUES OF BERGER C AND D COEFFICIENTS FOR PHOTON ENERGY-ABSORPTION
C   BUILDUP FACTORS IN AIR
C
      DATA CAR/    0.0330,   0.132,   0.330,    1.12,    2.31,    3.46,
     2     4.20,    4.46,    4.15,    3.25,    2.70,    2.19,    1.87,
     3     1.68,    1.53,    1.34,    1.21,   0.995,   0.838,   0.687,
     4    0.602,   0.546,   0.508,   0.457,   0.426/
      DATA DAR/   -0.0680, -0.0693, -0.0607, -0.0230,  0.0284,  0.0743,
     2    0.108,   0.151,   0.168,   0.178,   0.172,   0.142,   0.125,
     3    0.106,  0.0946,  0.0745,  0.0604,  0.0373,  0.0242,  0.0100,
     4   0.0032, -0.0012, -0.0029, -0.0035, -0.0033/
C
C ENERGIES FOR REFERENCE VALUES OF SCALING PARAMETER 'ALPHA' FOR AIR IMMERSION
C
      DATA EAR/    0.010, 0.020, 0.050, 0.100, 0.200, 0.500,   1.0,
     2        2.0/
C
C REFERENCE VALUES OF ELECTRON SCALING PARAMETER 'ALPHA' FOR AIR IMMERSION
C
      DATA ALPHAR/ 1.022, 1.018, 1.018, 1.018, 1.017, 1.018, 1.009,
     2       0.992/
C
C FACTOR TO CONVERT ABSORBED ENERGY IN MEV TO DOSE-EQUIVALENT IN SV IN
C  (G-SV)/MEV
C NUMBER OF SECONDS PER YEAR
C
      DATA FK, FS/ 1.60206E-10, 3.1536E+07/
C
C DENSITY OF DRY AIR AT 20 DEG C AND 750 MM PRESSURE IN G/(CUBIC CM)
C DENSITY OF WATER AT 20 DEG C IN G/(CUBIC CM)
C HEIGHT OF REFERENCE POSITION FOR GROUND SURFACE EXPOSURE IN CM
C
      DATA RHCA, RHOW, Z/ 1.189E-03, 0.99823, 100.0/
C
C DISTANCES FROM BODY SURFACE TO FRONT, MIDPOINT, AND BACK OF DERMIS AND TO
C   CRITICAL LAYER OF SKIN IN CM
C DENSITY OF SKIN TISSUE IN G/(CUBIC CM)
C
      DATA ZSKN, RHOSK/ 5.0E-03, 0.0675, 0.130, 7.0E-03, 1.12/
C
C PARTICLE-MEDIUM DOSE-RATE CORRECTION FACTORS; ORDER IS PHOTON DOSE-RATE
C   CORRECTION FACTOR FOR AIR IMMERSION, WATER IMMERSION, AND GROUND SURFACE
C   EXPOSURE, AND ELECTRON DOSE-RATE CORRECTION FACTOR FOR THREE EXPOSURE MODES
C
      DATA CPM/ 0.5, 2*1.0, 3*0.5/
C
      LOGICAL FIRST/ .TRUE./
C
C TEST FOR FIRST TIME THROUGH SUBROUTINE
C
      IF (.NOT. FIRST) GO TO 19
C
C CALCULATE REFERENCE VALUES OF RATIOS OF PHOTON MASS ENERGY-ABSORPTION
C   COEFFICIENTS IN TISSUE TO VALUES IN WATER AND ELECTRON MASS STOPPING POWERS
C   IN TISSUE TO VALUES IN AIR AND WATER AT ENERGIES GIVEN BY VALUES OF ER
C
      DO 20 I=1,25
      GTWR(I)=FMUETR(I)/FMUEWR(I)
      BTAR(I)=SPTR(I)/SPAR(I)
      BTWR(I)=SPTR(I)/SPWR(I)
   20 CONTINUE
C
C CALCULATE CONSTANT FACTOR IN DOSE-RATE CONVERSION FACTOR EQUATIONS
C
      FAC1=FK*FJ
C
C CALCULATE HEIGHT OF REFERENCE POSITION FOR GROUND SURFACE EXPOSURE IN
C   G/(SQUARE CM)
C
      R=RHOA*Z
C
C CALCULATE DISTANCES FROM BODY SURFACE TO FRONT, MIDPOINT, AND BACK OF DERMIS
C   AND TO CRITICAL LAYER OF SKIN IN G/(SQUARE CM)
C
      DO 60 I=1,4
      RSKN(I)=RHOSK*ZSKN(I)
   60 CONTINUE
C
C CALCULATE MINIMUM ELECTRON ENERGIES CONTRIBUTING TO DOSE-RATE FACTORS FOR
C   DIFFERENT EXPOSURE MODES
C
C   AIR AND WATER IMMERSION - FRONT, MIDPOINT, AND BACK OF DERMIS AND CRITICAL
C     LAYER OF SKIN
C
      DO 61 I=1,4
      EMAW(I)=YINTER(RSKN(I), RNTR, ER, 0, 3, 25)
   61 CONTINUE
C
C   GROUND-SURFACE EXPOSURE: CALCULATIONS FOR SKIN ASSUME THAT THICKNESS OF
C     TISSUE IS REPLACED BY EQUIVALENT THICKNESS OF AIR - ORDER OF CALCULATIONS
C     IS BODY SURFACE, FRONT, MIDPOINT, AND BACK OF DERMIS, AND CRITICAL LAYER
C     OF SKIN
C
      EMGRS=YINTER(R, RNAR, ER, 0, 3, 25)
      DO 62 I=1,4
      RA(I)=R+RSKN(I)*1.14
      EMGR(I)=YINTER(RA(I), RNAR, ER, 0, 3, 25)
   62 CONTINUE
C
C DEFINE ENERGIES FOR CALCULATING SPECTRUM FOR BETA PARTICLE OR POSITRON--VALUES
C   ARE EVERY 10 KEV FROM 0 TO 12 MEV
C
      EBSR(1)=0.0
      DO 39 I=2,1201
      EBSR(I)=EBSR(I-1)+0.010
   39 CONTINUE
C
C AT ENERGIES GIVEN BY ALTERNATE VALUES OF EBSR, CALCULATE RATIOS OF ELECTRON
C   MASS STOPPING POWER IN TISSUE TO VALUES IN AIR AND WATER, VALUE OF ELECTRON
C   SCALING PARAMETER 'ALPHA', AND GEOMETRICAL REDUCTION FACTORS FOR ELECTRON
C   DOSE-RATE CONVERSION FACTORS FOR FRONT, MIDPOINT, AND BACK OF DERMIS FOR AIR
C   AND WATER IMMERSION
C
C   CALCULATE LOGARITHM OF REFERENCE ENERGIES FOR ELECTRON SCALING PARAMETER
C
```

```
      DO 63 I=1,8
      EARL(I)=ALOG(EAR(I))
   63 CONTINUE
      DO 64 J=2,1200,2
      K=J/2
C
C    CALCULATE RATIOS OF ELECTRON MASS STOPPING POWER IN TISSUE TO VALUES IN AIR
C      AND WATER
C
      RTAR(K)=YINTER(EBSR(J), ER, BTAR, 0, 3, 25)
      RTWR(K)=YINTER(EBSR(J), ER, BTWR, 0, 3, 25)
C
C    CALCULATE ELECTRON SCALING PARAMETER 'ALPHA'
C
      ALR(K)=YINTER(ALOG(EBSR(J)), EARL, ALPHAR, 0, 3, 8)
C
C    CALCULATE ELECTRON GEOMETRICAL REDUCTION FACTORS FOR FRONT, MIDPOINT, AND
C      BACK OF DERMIS AND CRITICAL LAYER OF SKIN FOR AIR AND WATER IMMERSION;
C      RESET LOGICAL VARIABLE
C
      DO 65 I=1,4
      IF (EBSR(J) .GE. EMAW(I)) GO TO 66
      GFAC(I,K)=0.0
      GO TO 65
   66 GFAC(I,K)=G(RSKN(I), RNTR, EBSR(J))
   65 CONTINUE
   64 CONTINUE
      FIRST=.FALSE.
C
C INITIALIZE SUMMATION TERMS IN DOSE-RATE CONVERSION FACTOR EQUATIONS
C
C    PHOTON BODY-SURFACE DOSE-RATE FROM AIR IMMERSION, WATER IMMERSION, AND
C      GROUND SURFACE EXPOSURE
C
   19 SGA=0.0
      SGW=0.0
      SGG=0.0
C
C    ELECTRON BODY-SURFACE DOSE-RATE FOR THREE EXPOSURE MODES
C
      SBA=0.0
      SBW=0.0
      SBG=0.0
C
C    PHOTON ORGAN DOSE-RATE FOR THREE EXPOSURE MODES
C
      DO 1 J=1,24
      SGAORG(J)=0.0
      SGWORG(J)=0.0
      SGGORG(J)=0.0
    1 CONTINUE
C
C    ELECTRON SKIN DOSE-RATE FOR THREE EXPOSURE MODES
C
      DO 38 J=1,4
      SBASKN(J)=0.0
      SBWSKN(J)=0.0
      SBGSKN(J)=0.0
   38 CONTINUE
      IF (NGAM .EQ. 0) GO TO 2
C
C CALCULATE SUMMATION TERMS IN PHOTON DOSE-RATE CONVERSION FACTOR EQUATIONS
C
      DO 3 I=1,NGAM
C
C    CALCULATE RATIOS OF MASS ENERGY-ABSORPTION COEFFICIENTS IN TISSUE TO VALUES
C      IN AIR AND WATER
C
      RTA=YINTER(EGAM(I), ER, GTAR, 0, 3, 25)
      RTW=YINTER(EGAM(I), ER, GTWR, 0, 3, 25)
C
C    CALCULATE MASS ENERGY ABSORPTION AND MASS ATTENUATION COEFFICIENTS IN AIR IN
C      (SQUARE CM)/G
C
      FMA=YINTER(EGAM(I), ER, FMUEAR, 0, 3, 25)
      FMAL=YINTER(EGAM(I), ER, FMUAR, 0, 3, 25)
C
C    CALCULATE BERGER BUILDUP FACTOR COEFFICIENTS C AND D IN AIR
C
      IF (EGAM(I) .GT. ER(1)) GO TO 15
C
C      USE LINEAR INTERPOLATION FOR C COEFFICIENT FOR ENERGIES LESS THAN 10 KEV
C
      CA=(EGAM(I)/ER(1))*CAR(1)
      GO TO 16
   15 CA=YINTER(EGAM(I), ER, CAR, 0, 3, 25)
   16 DA=YINTER(EGAM(I), ER, DAR, 0, 3, 25)
C
C    CALCULATE RATIOS OF ORGAN DOSE RATE TO DOSE RATE IN AIR FOR AIR IMMERSION
C
      DO 4 K=1,24
      ORGFAC(K)=FAC(K, EGAM(I))
    4 CONTINUE
C
C    CALCULATE SUMMATION TERMS
C
      TS=FGAM(I)*EGAM(I)
C
C      AIR IMMERSION FOR BODY SURFACE
C
      SGA=SGA+TS*RTA
C
C      WATER IMMERSION FOR BODY SURFACE
C
      SGW=SGW+TS*RTW
C
C      GROUND SURFACE EXPOSURE IN AIR AND FOR BODY SURFACE
C
      TGA=FMA*(E1(DBLE(FMAL), DBLE(R))-(CA/(DA-1.0))*EXP((DA-1.0)*FMAL*
     2 R))
      TGS=TGA*RTA
      SGG=SGG+TS*TGS
C
C      THREE EXPOSURE MODES FOR ORGANS
C
      DO 5 K=1,24
      SGAORG(K)=SGAORG(K)+TS*ORGFAC(K)
      SGWORG(K)=SGWORG(K)+TS*ORGFAC(K)*RTW/RTA
      SGGORG(K)=SGGORG(K)+TS*TGA*ORGFAC(K)
    5 CONTINUE
    3 CONTINUE
C
C CALCULATE PHOTON DOSE-RATE CONVERSION FACTORS FOR THREE EXPOSURE MODES
C
C   BODY SURFACE
C
    2 DOSE(1)=CPM(1)*FAC1*SGA/RHOA
      DOSE(2)=CPM(2)*FAC1*SGW/RHOW
      DOSE(3)=0.5*CPM(3)*FAC1*SGG
C
C   ORGANS
C
      DO 6 K=1,24
      DOSORG(1,K)=CPM(1)*FAC1*SGAORG(K)/RHOA
      DOSORG(2,K)=CPM(2)*FAC1*SGWORG(K)/RHOW
      DOSORG(3,K)=0.5*CPM(3)*FAC1*SGGORG(K)
    6 CONTINUE
C
C CALCULATE SUMMATION TERMS IN ELECTRON DOSE-RATE CONVERSION FACTOR EQUATIONS
C
      IF (NBETA .EQ. 0) GO TO 7
C
C   BETA-PARTICLES
C
      DO 8 I=1,NBETA
C
C     AIR IMMERSION AND WATER IMMERSION FOR BODY SURFACE
C
C       CALCULATE RATIOS OF MASS STOPPING POWERS IN TISSUE TO VALUES IN AIR AND
C         WATER
C
      RTA=YINTER(EBAVG(I), ER, BTAR, 0, 3, 25)
      RTW=YINTER(EBAVG(I), ER, BTWR, 0, 3, 25)
C
C       CALCULATE SUMMATION TERMS
C
      TS=FBETA(I)*EBAVG(I)
      SBA=SBA+TS*RTA
      SBW=SBW+TS*RTW
      IF (EBMAX(I) .LT. AMIN1(EMGRS, EMAW(1))) GO TO 8
C
C     CALCULATE BETA-PARTICLE SPECTRUM
C
C       SET INDEX FOR ALLOWED BETA TRANSITION
C
      NCD=1
C
C       TEST FOR FIRST-FORBIDDEN UNIQUE TRANSITION AND RESET INDEX
C
      IF (NFB .EQ. 0) GO TO 24
      DO 25 J=1,NFB
      IF (I .NE. NBF(J)) GO TO 25
      NCD=-1
      GO TO 24
```

```
   25 CONTINUE
C
C       CALCULATE SPECTRUM
C
   24 CALL BSPEC (EBMAX(I), FBETA(I), EBSR, ATNO, NCD, FIE, JSPEC, EMID)
C
C       CALCULATE RATIOS OF MASS STOPPING POWERS IN TISSUE TO VALUES IN AIR AND
C         WATER FOR ENERGY INTERVAL CONTAINING ENDPOINT ENERGY
C
      RTA=YINTER(EMID, ER, BTAR, 0, 3, 25)
      RTW=YINTER(EMID, ER, BTWR, 0, 3, 25)
      IF (EBMAX(I) .LT. EMGRS) GO TO 23
C
C     GROUND SURFACE EXPOSURE FOR BODY SURFACE
C
C       CONTRIBUTIONS FROM ENERGY INTERVALS CENTERED AT ALTERNATE VALUES OF EBSR
C
      DO 26 J=2,JSPEC,2
      IF (EBSR(J) .LT. EMGRS) GO TO 26
      K=J/2
      CALL BGRND (EBSR(J), RNAR, R, RANGE, EINT)
      TG=FIE(K)*EBSR(J)*RTAR(K)*EINT/RANGE
      SBG=SBG+TG
   26 CONTINUE
C
C       CONTRIBUTION FROM ENERGY INTERVAL CONTAINING ENDPOINT ENERGY
C
      CALL BGRND (EMID, RNAR, R, RANGE, EINT)
      TG=FIE(K+1)*EMID*RTA*EINT/RANGE
      SBG=SBG+TG
C
C     AIR IMMERSION AND WATER IMMERSION FOR FRONT, MIDPOINT, AND BACK OF DERMIS
C       AND CRITICAL LAYER OF SKIN
C
   23 DO 28 L=1,4
      IF (EBMAX(I) .LT. EMAW(L)) GO TO 28
C
C       CONTRIBUTIONS FROM ENERGY INTERVALS CENTERED AT ALTERNATE VALUES OF EBSR
C
      DO 29 J=2,JSPEC,2
      IF (EBSR(J) .LT. EMAW(L)) GO TO 29
      K=J/2
      TA=FIE(K)*EBSR(J)*RTAR(K)*GFAC(L,K)/ALR(K)
      TW=FIE(K)*EBSR(J)*RTWR(K)*GFAC(L,K)
      SBASKN(L)=SBASKN(L)+TA
      SBWSKN(L)=SBWSKN(L)+TW
   29 CONTINUE
C
C       CONTRIBUTION FROM ENERGY INTERVAL CONTAINING ENDPOINT ENERGY
C
      ALEND=YINTER(ALOG(EMID), EARL, ALPHAR, 0, 3, 8)
      GEND=G(RSKN(L), RNTR, EMID)
      TA=FIE(K+1)*EMID*RTA*GEND/ALEND
      TW=FIE(K+1)*EMID*RTW*GEND
      SBASKN(L)=SBASKN(L)+TA
      SBWSKN(L)=SBWSKN(L)+TW
   28 CONTINUE
C
```

```
C     GROUND SURFACE EXPOSURE FOR FRONT, MIDPOINT, AND BACK OF DERMIS AND
C       CRITICAL LAYER OF SKIN
C
      DO 43 L=1,4
      IF (EBMAX(I) .LT. EMGR(L)) GO TO 43
C
C       CONTRIBUTIONS FROM ENERGY INTERVALS CENTERED AT ALTERNATE VALUES OF EBSR
C
      DO 44 J=2,JSPEC,2
      IF (EBSR(J) .LT. EMGR(L)) GO TO 44
      K=J/2
      CALL BGRND (EBSR(J), RNAR, RA(L), RANGE, EINT)
      TG=FIE(K)*EBSR(J)*RTAR(K)*EINT/RANGE
      SBGSKN(L)=SBGSKN(L)+TG
   44 CONTINUE
C
C       CONTRIBUTION FROM ENERGY INTERVAL CONTAINING ENDPOINT ENERGY
C
      CALL BGRND (EMID, RNAR, RA(L), RANGE, EINT)
      TG=FIE(K+1)*EMID*RTA*EINT/RANGE
      SBGSKN(L)=SBGSKN(L)+TG
   43 CONTINUE
    8 CONTINUE
    7 IF (NPOS .EQ. 0) GO TO 10
C
C   POSITRONS
C
      DO 11 I=1,NPOS
C
C     AIR IMMERSION AND WATER IMMERSION FOR BODY SURFACE
C
C       CALCULATE RATIOS OF MASS STOPPING POWERS IN TISSUE TO VALUES IN AIR AND
C         WATER
C
      RTA=YINTER(EPAVG(I), ER, RTAR, 0, 3, 25)
      RTW=YINTER(EPAVG(I), ER, RTWR, 0, 3, 25)
C
C       CALCULATE SUMMATION TERMS
C
      TS=FPOS(I)*EPAVG(I)
      SBA=SBA+TS*RTA
      SBW=SBW+TS*RTW
      IF (EPMAX(I) .LT. AMIN1(EMGRS, EMAW(1))) GO TO 11
C
C     CALCULATE POSITRON SPECTRUM
C
C       SET INDEX FOR ALLOWED POSITRON TRANSITION
C
      NCD=2
C
C       TEST FOR FIRST-FORBIDDEN UNIQUE TRANSITION AND RESET INDEX
C
      IF (NFP .EQ. 0) GO TO 67
      DO 68 J=1,NFP
      IF (I .NE. NPF(J)) GO TO 68
      NCD=-2
      GO TO 67
   68 CONTINUE
```

```
C
C        CALCULATE SPECTRUM
C
   67 CALL BSPEC (EPMAX(I), FPOS(I), EBSR, ATNO, NCD, FIE, JSPEC, EMID)
C
C        CALCULATE RATIOS OF MASS STOPPING POWERS IN TISSUE TO VALUES IN AIR AND
C          WATER FOR ENERGY INTERVAL CONTAINING ENDPOINT ENERGY
C
      RTA=YINTER(EMID, ER, BTAR, 0, 3, 25)
      RTW=YINTER(EMID, ER, BTWR, 0, 3, 25)
      IF (EPMAX(I) .LT. EMGRS) GO TO 70
C
C      GROUND SURFACE EXPOSURE FOR BODY SURFACE
C
C        CONTRIBUTIONS FROM ENERGY INTERVALS CENTERED AT ALTERNATE VALUES OF EBSR
C
      DO 71 J=2,JSPEC,2
      IF (EBSR(J) .LT. EMGRS) GO TO 71
      K=J/2
      CALL BGRND (EBSR(J), RNAR, R, RANGE, EINT)
      TG=FIE(K)*EBSR(J)*RTAR(K)*EINT/RANGE
      SBG=SBG+TG
   71 CONTINUE
C
C        CONTRIBUTION FROM ENERGY INTERVAL CONTAINING ENDPOINT ENERGY
C
      CALL BGRND (EMID, RNAR, R, RANGE, EINT)
      TG=FIE(K+1)*EMID*RTA*EINT/RANGE
      SBG=SBG+TG
C
C      AIR IMMERSION AND WATER IMMERSION FOR FRONT, MIDPOINT, AND BACK OF DERMIS
C        AND CRITICAL LAYER OF SKIN
C
   70 DO 74 L=1,4
      IF (EPMAX(I) .LT. EMAW(L)) GO TO 74
C
C        CONTRIBUTIONS FROM ENERGY INTERVALS CENTERED AT ALTERNATE VALUES OF EBSR
C
      DO 75 J=2,JSPEC,2
      IF (EBSR(J) .LT. EMAW(L)) GO TO 75
      K=J/2
      TA=FIE(K)*EBSR(J)*RTAR(K)*GFAC(L,K)/ALR(K)
      TW=FIE(K)*EBSR(J)*RTWR(K)*GFAC(L,K)
      SBASKN(L)=SBASKN(L)+TA
      SBWSKN(L)=SBWSKN(L)+TW
   75 CONTINUE
C
C        CONTRIBUTION FROM ENERGY INTERVAL CONTAINING ENDPOINT ENERGY
C
      ALEND=YINTER(ALOG(EMID), EARL, ALPHAR, 0, 3, 8)
      GEND=G(RSKN(L), RNTR, EMID)
      TA=FIE(K+1)*EMID*RTA*GEND/ALEND
      TW=FIE(K+1)*EMID*RTW*GEND
      SBASKN(L)=SBASKN(L)+TA
      SBWSKN(L)=SBWSKN(L)+TW
   74 CONTINUE
C
C      GROUND SURFACE EXPOSURE FOR FRONT, MIDPOINT, AND BACK OF DERMIS AND
```

```
C        CRITICAL LAYER OF SKIN
C
      DO 78 L=1,4
      IF (EPMAX(I) .LT. EMGR(L)) GO TO 78
C
C        CONTRIBUTIONS FROM ENERGY INTERVALS CENTERED AT ALTERNATE VALUES OF EBSR
C
      DO 79 J=2,JSPEC,2
      IF (EBSR(J) .LT. EMGR(L)) GO TO 79
      K=J/2
      CALL BGRND (EBSR(J), RNAR, RA(L), RANGE, EINT)
      TG=FIE(K)*EBSR(J)*RTAR(K)*EINT/RANGE
      SBGSKN(L)=SBGSKN(L)+TG
   79 CONTINUE
C
C        CONTRIBUTION FROM ENERGY INTERVAL CONTAINING ENDPOINT ENERGY
C
      CALL BGRND (EMID, RNAR, RA(L), RANGE, EINT)
      TG=FIE(K+1)*EMID*RTA*EINT/RANGE
      SBGSKN(L)=SBGSKN(L)+TG
   78 CONTINUE
   11 CONTINUE
   10 IF (NELEC .EQ. 0) GO TO 13
C
C    AUGER AND CONVERSION ELECTRONS
C
      DO 14 I=1,NELEC
C
C     AIR IMMERSION AND WATER IMMERSION FOR BODY SURFACE
C
C        CALCULATE RATIOS OF MASS STOPPING POWERS IN TISSUE TO VALUES IN AIR AND
C          WATER
C
      RTA=YINTER(EELEC(I), ER, BTAR, 0, 3, 25)
      RTW=YINTER(EELEC(I), ER, BTAR, 0, 3, 25)
C
C        CALCULATE SUMMATION TERMS
C
      TS=FELEC(I)*EELEC(I)
      SBA=SBA+TS*RTA
      SBW=SBW+TS*RTW
      IF (EELEC(I) .LT. AMIN1(EMGRS, EMAW(1))) GO TO 14
      IF (EELEC(I) .LT. EMGRS) GO TO 17
C
C     GROUND SURFACE EXPOSURE FOR BODY SURFACE
C
      CALL BGRND (EELEC(I), RNAR, R, RANGE, EINT)
      TG=TS*RTA*EINT/RANGE
      SBG=SBG+TG
C
C     AIR IMMERSION AND WATER IMMERSION FOR FRONT, MIDPOINT, AND BACK OF DERMIS
C       AND CRITICAL LAYER OF SKIN
C
   17 DO 18 L=1,4
      IF (EELEC(I) .LT. EMAW(L)) GO TO 18
      ALEND=YINTER(ALOG(EELEC(I)), EARL, ALPHAP, 0, 3, 8)
      GEND=G(RSKN(L), RNTR, EELEC(I))
      TA=TS*RTA*GEND/ALEND
      TW=TS*RTW*GEND
      SBASKN(L)=SBASKN(L)+TA
      SBWSKN(L)=SBWSKN(L)+TW
   18 CONTINUE
C
C     GROUND SURFACE EXPOSURE FOR FRONT, MIDPOINT, AND BACK OF DERMIS AND
C       CRITICAL LAYER OF SKIN
C
      DO 82 L=1,4
      IF (EELEC(I) .LT. EMGR(L)) GO TO 82
      CALL BGRND (EELEC(I), RNAR, RA(L), RANGE, EINT)
      TG=TS*RTA*EINT/RANGE
      SBGSKN(L)=SBGSKN(L)+TG
   82 CONTINUE
   14 CONTINUE
C
C CALCULATE ELECTRON DOSE-RATE CONVERSION FACTORS FOR THREE EXPOSURE MODES
C
C   BODY SURFACE
C
   13 DOSE(4)=CPM(4)*FAC1*SBA/RHOA
      DOSE(5)=CPM(5)*FAC1*SBW/RHOW
      DOSE(6)=0.5*CPM(6)*FAC1*SBG
C
C   FRONT, MIDPOINT, AND BACK OF DERMIS AND CRITICAL LAYER OF SKIN
C
      DO 83 K=1,4
      DOSORB(1,K)=FAC1*SBASKN(K)/RHOA
      DOSORB(2,K)=FAC1*SBWSKN(K)/RHOW
      DOSORB(3,K)=0.5*CPM(6)*FAC1*SBGSKN(K)
   83 CONTINUE
C
C CALCULATE SUMS OF PHOTON AND ELECTRON DOSE-RATE CONVERSION FACTORS FOR BODY
C   SURFACE FOR THREE EXPOSURE MODES
C
      DOSE(7)=DOSE(1)+DOSE(4)
      DOSE(8)=DOSE(2)+DOSE(5)
      DOSE(9)=DOSE(3)+DOSE(6)
C
C CALCULATE SUMS OF PHOTON AND ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN
C   USING VALUE AT 70 MICRON DEPTH FOR ELECTRONS
C
      DO 59 I=1,3
      DOSSKN(I)=DOSORG(I,17)+DOSORB(I,4)
   59 CONTINUE
C
C CALCULATE ELECTRON DOSE-RATE FACTOR AVERAGED OVER THICKNESS OF DERMIS FOR
C   THREE EXPOSURE MODES
C
      DO 84 I=1,3
      IF (DOSORB(I,1) .EQ. 0.0) GO TO 87
C
C   TEST FOR NON-ZERO VALUE OF DOSE-RATE FACTOR FOR BACK OF DERMIS
C
      IF (DOSORB(I,3) .EQ. 0.0) GO TO 85
C
C   CALCULATE AVERAGE DOSE-RATE FACTOR USING SIMPSON'S RULE
C
```

```
      DOSORB(I,5)=(DOSORB(I,1)+DOSORB(I,3)+4.*DOSORB(I,2))/6.
      GO TO 84
C
C   CALCULATE LOCATION IN DERMIS WHERE DOSE-RATE FACTOR BECOMES ZERO
C
C     CALCULATE MAXIMUM ENERGY IN ELECTRON SPECTRUM
C
   85 EMAX=0.0
      IF (NBETA .EQ. 0) GO TO 90
      EMAX=EBMAX(NBETA)
      IF (NBETA .GT. 1) EMAX=AMAX1(EMAX, EBMAX(NBETA-1))
   90 IF (NPOS .EQ. 0) GO TO 91
      EMAX=AMAX1(EMAX, EPMAX(NPOS))
      IF (NPOS .GT. 1) EMAX=AMAX1(EMAX, EPMAX(NPOS-1))
   91 IF (NELEC .EQ. 0) GO TO 92
      EMAX=AMAX1(EMAX, EELEC(NELEC))
C
C     CALCULATE RANGE IN TISSUE FOR MAXIMUM ELECTRON ENERGY IN CM
C
   92 IF (I .EQ. 1) ZMAX=YINTER(EMAX, ER, RNTR, 0, 3, 25)/RHOSK
      IF (I .EQ. 3) ZMAX=(YINTER(EMAX, ER, RNAR, 0, 3, 25)-R)/(1.14*
     2 RHOSK)
C
C   TEST FOR NON-ZERO VALUE OF DOSE-RATE FACTOR FOR MIDPOINT OF DERMIS
C
      IF (DOSORB(I,2) .EQ. 0.0) GO TO 86
C
C   CALCULATE AVERAGE DOSE-RATE FACTOR USING TRAPEZOIDAL AND TRIANGLE RULES
C
      DOSORB(I,5)=(DOSORB(I,1)+DOSORB(I,2))/4.+DOSORB(I,2)*(ZMAX-
     2 ZSKN(2))/(2.*(ZSKN(3)-ZSKN(1)))
      GO TO 84
C
C   CALCULATE AVERAGE DOSE-RATE FACTOR USING TRIANGLE RULE
C
   86 DOSORB(I,5)=DOSORB(I,1)*ABS(ZMAX-ZSKN(1))/(2.*(ZSKN(3)-ZSKN(1)))
      GO TO 84
   87 DOSORB(I,5)=0.0
   84 CONTINUE
      RETURN
      END
```

```
C
      FUNCTION YINTER(XI, X, Y, IND1, N1, IMAX)
C
C PERFORMS LAGRANGIAN INTERPOLATION OF A FUNCTION OF ONE VARIABLE
C
C BASED ON DOUBLE PRECISION INTERPOLATION FUNCTION YLAG DESCRIBED IN UNION
C    CARBIDE PUBLICATION CTC-39
C
C    XI - ABCISSA OF DESIRED INTERPOLATION POINT
C    X - SINGLY DIMENSIONED ARRAY OF DISTINCT, MONOTONICALLY INCREASING ABCISSAS
C    Y - SINGLY DIMENSIONED ARRAY OF CORRESPONDING ORDINATES
C    IND1 - SET TO ZERO
C    N1 - NUMBER OF POINTS FOR THE INTERPOLATION POLYNOMIAL
C    IMAX - NUMBER OF ELEMENTS FOR THE X- OR Y-ARRAYS
C
      DIMENSION X(1), Y(1)
      IND=IND1
      N=N1
      IEX=0
      IF (N .LE. IMAX) GO TO 10
      N=IMAX
      IEX=N
   10 IF (IND .GT. 0) GO TO 40
      DO 20 J=1,IMAX
      IF (XI-X(J)) 30, 130, 20
   20 CONTINUE
      IEX=1
      GO TO 70
   30 IND=J
   40 IF (IND .GT. 1) GO TO 50
      IEX=-1
   50 INL=IND-(N+1)/2
      IF (INL .GT. 0) GO TO 60
      INL=1
   60 INU=INL+N-1
      IF (INU .LE. IMAX) GO TO 80
   70 INL=IMAX-N+1
      INU=IMAX
   80 S=0.
      P=1.
      DO 110 J=INL,INU
      P=P*(XI-X(J))
      D=1.
      DO 100 I=INL,INU
      IF (I .NE. J) GO TO 90
      XD=XI
      GO TO 100
   90 XD=X(J)
  100 D=D*(XD-X(I))
  110 S=S+Y(J)/D
      YINTER=S*P
  120 RETURN
  130 YINTER=Y(J)
      GO TO 120
      END
```

```
C
      FUNCTION G(R, RNGTR, EB)
C
C CALCULATES GEOMETRICAL REDUCTION FACTOR FOR ELECTRON DOSE-RATE CONVERSION
C   FACTOR FOR SKIN FOR AIR AND WATER IMMERSION; CALCULATIONS ARE BASED ON EQS.
C   (15)-(18) OF BERGER, HEALTH PHYSICS 26, 1 (1974)
C
C   R - DISTANCE FROM BODY SURFACE TO SKIN TISSUE IN G/(SQUARE CM)
C   RNGTR - REFERENCE ARRAY OF ELECTRON RANGES IN TISSUE IN G/(SQUARE CM) AT
C            ENERGIES GIVEN BY VALUES OF EGR BELOW
C   EB - ELECTRON ENERGY FOR EVALUATION OF GEOMETRICAL REDUCTION FACTOR
C
      DIMENSION RNGTR(1)
      DIMENSION ZDRNG(21), EGR(25), GR1(25), GR2(25), GR3(25), GR4(25),
     2 GR5(25), GR6(25), GR7(25), GR8(25), GR9(25), GR10(25), GR11(25),
     3 GR12(25), GR13(25), GR14(25), GR15(25), GR16(25), GR17(25),
     4 GR18(25), GR19(25), GR20(25), GR21(25), GR(25,21)
      DIMENSION ELR(17), Q1R(17), ALR(17), ZDALR(15), Q2R(15)
C
C RATIOS OF DISTANCE FROM BODY SURFACE TO ELECTRON RANGE FOR REFERENCE VALUES OF
C   ELECTRON GEOMETRICAL REDUCTION FACTORS
C
      DATA ZDRNG/   0.0, 0.05, 0.10, 0.15, 0.20, 0.25, 0.30, 0.35, 0.40,
     2 0.45, 0.50, 0.55, 0.60, 0.65, 0.70, 0.75, 0.80, 0.85, 0.90, 0.95,
     3 1.00/
C
C ENERGIES FOR REFERENCE VALUES OF ELECTRON GEOMETRICAL REDUCTION FACTORS
C
      DATA EGR/  0.010,  0.015,  0.020,  0.030,  0.040,  0.050,  0.060,
     2    0.080,  0.100,  0.150,  0.200,  0.300,  0.400,  0.500,  0.600,
     3    0.800,    1.0,    1.5,    2.0,    3.0,    4.0,    5.0,    6.0,
     4      8.0,   10.0/
C
C REFERENCE VALUES OF ELECTRON GEOMETRICAL REDUCTION FACTORS
C
C   ZDRNG=0.0
C
      DATA GR1/    0.5,     0.5,     0.5,     0.5,     0.5,     0.5,     0.5,
     2      0.5,     0.5,     0.5,     0.5,     0.5,     0.5,     0.5,     0.5,
     3      0.5,     0.5,     0.5,     0.5,     0.5,     0.5,     0.5,     0.5,
     4      0.5,     0.5/
C
C   ZDRNG=0.05
C
      DATA GR2/ 0.4188, 0.4195, 0.4200, 0.4201, 0.4200, 0.4199, 0.4197,
     2  0.4192, 0.4187, 0.4177, 0.4168, 0.4153, 0.4143, 0.4133, 0.4123,
     3  0.4109, 0.4098, 0.4077, 0.4063, 0.4051, 0.4045, 0.4041, 0.4039,
     4  0.4039, 0.4041/
C
C   ZDRNG=0.10
C
      DATA GR3/ 0.3575, 0.3587, 0.3595, 0.3598, 0.3599, 0.3599, 0.3597,
     2  0.3591, 0.3586, 0.3573, 0.3561, 0.3540, 0.3526, 0.3512, 0.3500,
     3  0.3480, 0.3465, 0.3436, 0.3419, 0.3403, 0.3396, 0.3393, 0.3391,
     4  0.3392, 0.3395/
C
```

```
C     ZDRNG=0.15
C
        DATA GR4/ 0.3047, 0.3063, 0.3073, 0.3079, 0.3081, 0.3081, 0.3079,
       2  0.3074, 0.3069, 0.3054, 0.3041, 0.3018, 0.3002, 0.2987, 0.2974,
       3  0.2952, 0.2937, 0.2906, 0.2887, 0.2871, 0.2865, 0.2863, 0.2862,
       4  0.2866. 0.2871/
C
C     ZDRNG=0.20
C
        DATA GR5/ 0.2580, 0.2600, 0.2611, 0.2618, 0.2621, 0.2621, 0.2620,
       2  0.2614, 0.2609, 0.2592, 0.2582, 0.2559, 0.2544, 0.2529, 0.2516,
       3  0.2494, 0.2479, 0.2449, 0.2431, 0.2418, 0.2414, 0.2414, 0.2414,
       4  0.2420, 0.2427/
C
C     ZDRNG=0.25
C
        DATA GR6/ 0.2165, 0.2186, 0.2197, 0.2205, 0.2207, 0.2208, 0.2207,
       2  0.2202, 0.2197, 0.2181, 0.2171, 0.2150, 0.2136, 0.2122, 0.2109,
       3  0.2089, 0.2077, 0.2050, 0.2034, 0.2025, 0.2023, 0.2025, 0.2027,
       4  0.2036, 0.2046/
C
C     ZDRNG=0.30
C
        DATA GR7/ 0.1793, 0.1815, 0.1826, 0.1833, 0.1835, 0.1835, 0.1835,
       2  0.1830, 0.1817, 0.1812, 0.1802, 0.1783, 0.1771, 0.1759, 0.1748,
       3  0.1731, 0.1720, 0.1697, 0.1685, 0.1681, 0.1682, 0.1687, 0.1691,
       4  0.1701, 0.1713/
C
C     ZDRNG=0.35
C
        DATA GR8/ 0.1464, 0.1485, 0.1495, 0.1501, 0.1502, 0.1501, 0.1500,
       2  0.1495, 0.1483, 0.1479, 0.1470, 0.1454, 0.1444, 0.1434, 0.1425,
       3  0.1411, 0.1403, 0.1386, 0.1378, 0.1378, 0.1383, 0.1390, 0.1395,
       4  0.1408, 0.1423/
C
C     ZDRNG=0.40
C
        DATA GR9/ 0.1173, 0.1192, 0.1201, 0.1205, 0.1204, 0.1203, 0.1202,
       2  0.1197, 0.1192, 0.1182, 0.1175, 0.1162, 0.1154, 0.1146, 0.1138,
       3  0.1128, 0.1122, 0.1111, 0.1107, 0.1112, 0.1120, 0.1130, 0.1137,
       4  0.1152, 0.1168/
C
C     ZDRNG=0.45
C
        DATA GR10/0.0919, 0.0937, 0.0944, 0.0946, 0.0943, 0.0941, 0.0939,
       2  0.0934, 0.0929, 0.0920, 0.0915, 0.0904, 0.0898, 0.0891, 0.0886,
       3  0.0879, 0.0876, 0.0869, 0.0869, 0.0879, 0.0890, 0.0902, 0.0910,
       4  0.0928, 0.0946/
C
C     ZDRNG=0.50
C
        DATA GR11/0.0702, 0.0717, 0.0722, 0.0722, 0.0718, 0.0714, 0.0712,
       2  0.0707, 0.0702, 0.0694, 0.0690, 0.0681, 0.0677, 0.0672, 0.0668,
       3  0.0664, 0.0662, 0.0660, 0.0664, 0.0677, 0.0690, 0.0704, 0.0713,
       4  0.0733, 0.0752/
C
C     ZDRNG=0.55
C
```

```
      DATA GR12/0.0520, 0.0531, 0.0535, 0.0532, 0.0527, 0.0523, 0.0521,
     2 0.0518, 0.0512, 0.0504, 0.0501, 0.0494, 0.0490, 0.0487, 0.0485,
     3 0.0482, 0.0482, 0.0484, 0.0489, 0.0505, 0.0519, 0.0533, 0.0544,
     4 0.0564, 0.0584/
C
C    ZDRNG=0.60
C
      DATA GR13/0.0371, 0.0380, 0.0382, 0.0377, 0.0372, 0.0368, 0.0365,
     2 0.0361, 0.0356, 0.0349, 0.0347, 0.0341, 0.0339, 0.0337, 0.0335,
     3 0.0334, 0.0335, 0.0338, 0.0345, 0.0361, 0.0376, 0.0389, 0.0400,
     4 0.0421, 0.0441/
C
C    ZDRNG=0.65
C
      DATA GR14/0.0253, 0.0259, 0.0260, 0.0255, 0.0250, 0.0246, 0.0243,
     2 0.0239, 0.0235, 0.0229, 0.0226, 0.0221, 0.0220, 0.0219, 0.0218,
     3 0.0218, 0.0219, 0.0223, 0.0230, 0.0245, 0.0259, 0.0271, 0.0281,
     4 0.0301, 0.0320/
C
C    ZDRNG=0.70
C
      DATA GR15/0.0164, 0.0168, 0.0168, 0.0163, 0.0159, 0.0155, 0.0153,
     2 0.0149, 0.0145, 0.0140, 0.0138, 0.0134, 0.0133, 0.0132, 0.0132,
     3 0.0132, 0.0133, 0.0137, 0.0143, 0.0155, 0.0167, 0.0178, 0.0187,
     4 0.0205, 0.0222/
C
C    ZDRNG=0.75
C
      DATA GR16/0.0100, 0.0102, 0.0102, 0.0098, 0.0094, 0.0091, 0.0089,
     2 0.0086, 0.0083, 0.0078, 0.0077, 0.0074, 0.0073, 0.0072, 0.0072,
     3 0.0072, 0.0073, 0.0076, 0.0081, 0.0090, 0.0099, 0.0108, 0.0115,
     4 0.0130, 0.0144/
C
C    ZDRNG=0.80
C
      DATA GR17/0.0056, 0.0057, 0.0057, 0.0054, 0.0051, 0.0049, 0.0048,
     2 0.0045, 0.0043, 0.0040, 0.0038, 0.0036, 0.0035, 0.0035, 0.0035,
     3 0.0035, 0.0036, 0.0037, 0.0040, 0.0047, 0.0053, 0.0059, 0.0064,
     4 0.0075, 0.0086/
C
C    ZDRNG=0.85
C
      DATA GR18/0.0029, 0.0029, 0.0029, 0.0027, 0.0026, 0.0024, 0.0023,
     2 0.0022, 0.0020, 0.0018, 0.0017, 0.0015, 0.0015, 0.0014, 0.0014,
     3 0.0014, 0.0015, 0.0016, 0.0018, 0.0021, 0.0025, 0.0028, 0.0032,
     4 0.0039, 0.0046/
C
C    ZDRNG=0.90
C
      DATA GR19/0.0013, 0.0013, 0.0013, 0.0012, 0.0011, 0.0011, 0.0010,
     2 0.0009, 0.0008, 0.0007, 0.0006, 0.0005, 0.0005, 0.0005, 0.0005,
     3 0.0005, 0.0005, 0.0005, 0.0006, 0.0008, 0.0009, 0.0011, 0.0013,
     4 0.0017, 0.0021/
C
C    ZDRNG=0.95
C
      DATA GR20/0.0005, 0.0005, 0.0005, 0.0005, 0.0004, 0.0004, 0.0004,
     2 0.0003, 0.0003, 0.0002, 0.0002, 0.0001, 0.0001, 0.0001, 0.0001,
     3 0.0001, 0.0001, 0.0001, 0.0002, 0.0002, 0.0003, 0.0004, 0.0005,
     4 0.0006, 0.0008/
C
C   ZORNG=1.00
C
      DATA GR21/0.0001, 0.0001, 0.0001, 0.0001, 0.0001, 0.0001, 0.0001,
     2     0.0,     0.0,     0.0,     0.0,     0.0,     0.0,     0.0,    0.0,
     3     0.0,     0.0,     0.0,     0.0,     0.0, 0.0001, 0.0001, 0.0001,
     4 0.0002, 0.0002/
C
C ENERGIES FOR REFERENCE VALUES OF LEAKAGE CORRECTION PARAMETERS
C
      DATA ELR/   0.020,    0.030,    0.040,    0.050,    0.060,    0.080,
     2   0.100,   0.200,    0.300,    0.400,    0.500,    0.600,    0.800,
     3     1.0,     2.0,      3.0,      4.0/
C
C REFERENCE VALUES OF LEAKAGE CORRECTION PARAMETER Q1
C
      DATA Q1R/   0.122,    0.122,    0.122,    0.121,    0.121,    0.121,
     2   0.121,   0.115,    0.113,    0.109,    0.105,    0.102,    0.096,
     3   0.091,   0.072,    0.063,    0.057/
C
C REFERENCE VALUES OF LEAKAGE CORRECTION PARAMETER A IN CM
C
      DATA ALR/ 0.00064, 0.00130,  0.0022,   0.0032,   0.0044,   0.0073,
     2  0.0106,   0.033,    0.063,    0.096,    0.131,    0.169,     0.25,
     3    0.33,    0.82,     1.16,     1.57/
C
C SCALED DISTANCE Z/A FOR REFERENCE VALUES OF LEAKAGE CORRECTION PARAMETER Q2
C
      DATA ZOALR/   0.0, 0.00625,  0.0125,    0.025,    0.050,    0.075,
     2    0.10,    0.15,     0.20,     0.30,     0.40,     0.50,     0.60,
     3    0.80,    1.00/
C
C REFERENCE VALUES OF LEAKAGE CORRECTION PARAMETER Q2
C
      DATA Q2R/     1.0,    0.752,    0.639,    0.497,    0.352,    0.281,
     2   0.229,   0.165,    0.120,    0.072,    0.048,    0.030,    0.018,
     3   0.004,   0.001/
C
C DENSITY OF SKIN TISSUE IN G/(CUBIC CM)
C
      DATA RHCSK/ 1.12/
C
      EQUIVALENCE (GR(1,1), GR1(1)), (GR(1,2), GR2(1)), (GR(1,3),
     2 GR3(1)), (GR(1,4), GR4(1)), (GR(1,5), GR5(1)), (GR(1,6), GR6(1)),
     3 (GR(1,7), GR7(1)), (GR(1,8), GR8(1)), (GR(1,9), GR9(1)),
     4 (GR(1,10), GR10(1)), (GR(1,11), GR11(1)), (GR(1,12), GR12(1)),
     5 (GR(1,13), GR13(1)), (GR(1,14), GR14(1)), (GR(1,15), GR15(1)),
     6 (GR(1,16), GR16(1)), (GR(1,17), GR17(1)), (GR(1,18), GR18(1)),
     7 (GR(1,19), GR19(1)), (GR(1,20), GR20(1)), (GR(1,21), GR21(1))
C
C CALCULATE ELECTRON RANGE IN TISSUE
C
      RANGE=YINTER(EB, EGR, RNGTR, 0, 3, 25)
C
C CALCULATE RATIO OF DISTANCE FROM BODY SURFACE TO ELECTRON RANGE
C
```

```
      ZOVR=R/RANGE
C
C CALCULATE GEOMETRICAL REDUCTION FACTOR FOR GIVEN SCALED THICKNESS AND ENERGY
C   WITHOUT LEAKAGE CORRECTION
C
      G=DINTER(EB, ZOVR, EGR, ZORNG, GR, 25, 21, 4, 25)
C
C CALCULATE LEAKAGE CORRECTION TO GEOMETRICAL REDUCTION FACTOR
C
C   CALCULATE PARAMETERS Q1 AND A
C
      Q1=YINTER(EB, ELR, Q1R, 0, 3, 17)
      AL=YINTER(EB, ELR, ALR, 0, 3, 17)
C
C   CALCULATE SCALED DISTANCE Z/A AND PARAMETER Q2
C
      ZOAL=R/(AL*RHOSK)
      Q2=YINTER(ZOAL, ZOALR, Q2R, 0, 3, 15)
C
C   LEAKAGE CORRECTION
C
      QL=1.0-Q1*Q2
C
C CALCULATE GEOMETRICAL REDUCTION FACTOR WITH LEAKAGE CORRECTION
C
      G=QL*G
      IF (G .LT. 0.0) G=0.0
      RETURN
      END
```

```
C
      FUNCTION FAC(K, E)
C
C CALCULATES RATIO OF ORGAN DOSE RATE TO DOSE RATE IN AIR AT STP FOR PHOTONS
C   USING ORGAN DOSE-RATE FACTORS FOR MONOENERGETIC SOURCES AT THE BODY SURFACE
C   GIVEN BY O'BRIEN AND SANNA, HEALTH PHYSICS 30, 76 (1976), AND SCATTERED
C   SPECTRA FOR MONOENERGETIC SOURCES IN AN INFINITE ATMOSPHERIC CLOUD GIVEN BY
C   DILLMAN, HEALTH PHYSICS 27, 571 (1974); THE CALCULATIONS WERE PERFORMED BY
C   KERR AND ECKERMAN
C
C   K - INDEX FOR PARTICULAR ORGAN; SEE REFERENCE VALUES OF RATIOS GIVEN BELOW
C   E - PHOTON ENERGY
C
      DIMENSION EORG(15), ORG1(15), ORG2(15), ORG3(15), ORG4(15),
     2 ORG5(15), ORG6(15), ORG7(15), ORG8(15), ORG9(15), ORG10(15),
     3 ORG11(15), ORG12(15), ORG13(15), ORG14(15), ORG15(15), ORG16(15),
     4 ORG17(15), ORG18(15), ORG19(15), ORG20(15), ORG21(15), ORG22(15),
     5 ORG23(15), ORG24(15), ORG(15,24), ORGF(15), EORGL(15)
C
C ENERGIES FOR REFERENCE VALUES OF RATIOS OF ORGAN DOSE RATE TO BODY-SURFACE
C   DOSE RATE IN MEV
C
      DATA EORG/       0.010,    0.015,    0.020,    0.030,    0.050,
     2       0.100,    0.200,    0.500,      1.0,      1.5,      2.0,
     3         4.0,      6.0,      8.0,     10.0/
C
C REFERENCE VALUES OF RATIOS OF ORGAN DOSE RATE TO DOSE RATE IN AIR
C
C   ADRENALS
C
      DATA ORG1/     1.06E-03, 5.08E-03, 1.56E-02, 6.84E-02,    0.252,
     2       0.490,    0.544,    0.567,    0.576,    0.556,    0.615,
     3       0.638,    0.669,    0.700,    0.716/
C
C   BLADDER
C
      DATA ORG2/     1.91E-10, 2.97E-05, 4.98E-03, 9.08E-02,    0.307,
     2       0.472,    0.496,    0.519,    0.562,    0.561,    0.635,
     3       0.653,    0.677,    0.716,    0.745/
C
C   BRAIN
C
      DATA ORG3/     8.45E-05, 7.63E-04, 4.16E-03, 3.90E-02,    0.251,
     2       0.493,    0.529,    0.578,    0.633,    0.632,    0.710,
     3       0.709,    0.718,    0.741,    0.754/
C
C   BREAST
C
      DATA ORG4/     8.30E-02,    0.154,    0.238,    0.435,    0.748,
     2       0.887,    0.789,    0.691,    0.703,    0.698,    0.790,
     3       0.836,    0.863,    0.893,    0.905/
C
C   HEART
C
      DATA ORG5/     1.38E-04, 1.07E-03, 5.07E-03, 3.91E-02,    0.223,
     2       0.454,    0.483,    0.507,    0.556,    0.556,    0.635,
     3          0.651,     0.667,     0.694,     0.710/
C
C    SMALL INTESTINE
C
      DATA ORG6/     1.78E-06, 1.77E-04, 3.19E-03, 4.42E-02,     0.215,
     2          0.392,     0.431,     0.458,     0.506,     0.516,     0.591,
     3          0.621,     0.639,     0.663,     0.673/
C
C    UPPER LARGE INTESTINE
C
      DATA ORG7/     2.62E-06, 4.44E-05, 9.03E-03, 7.50E-02,     0.260,
     2          0.493,     0.512,     0.538,     0.592,     0.592,     0.675,
     3          0.692,     0.713,     0.747,     0.766/
C
C    LOWER LARGE INTESTINE
C
      DATA ORG8/     4.35E-04, 2.93E-03, 1.08E-02, 5.55E-02,     0.225,
     2          0.439,     0.481,     0.497,     0.544,     0.546,     0.623,
     3          0.649,     0.669,     0.696,     0.710/
C
C    KIDNEYS
C
      DATA ORG9/     1.27E-06, 4.66E-04, 1.57E-02,     0.153,     0.351,
     2          0.481,     0.510,     0.538,     0.590,     0.592,     0.679,
     3          0.722,     0.756,     0.795,     0.817/
C
C    LIVER
C
      DATA ORG10/    1.03E-05, 4.95E-04, 5.71E-03, 6.79E-02,     0.289,
     2          0.469,     0.494,     0.515,     0.559,     0.561,     0.639,
     3          0.655,     0.674,     0.710,     0.736/
C
C    LUNGS
C
      DATA ORG11/    8.38E-04, 5.11E-03, 1.80E-02, 8.96E-02,     0.325,
     2          0.522,     0.538,     0.554,     0.595,     0.592,     0.671,
     3          0.677,     0.693,     0.726,     0.749/
C
C    MARROW
C
      DATA ORG12/    5.03E-04, 5.62E-03, 2.53E-02,     0.150,     0.588,
     2          0.864,     0.748,     0.640,     0.635,     0.617,     0.687,
     3          0.698,     0.726,     0.773,     0.807/
C
C    RED MARROW
C
      DATA ORG13/    2.75E-04, 1.72E-03, 6.12E-03, 3.28E-02,     0.155,
     2          0.413,     0.536,     0.567,     0.602,     0.597,     0.679,
     3          0.713,     0.751,     0.795,     0.825/
C
C    OVARIES
C
      DATA ORG14/    4.15E-04, 2.84E-03, 1.15E-02, 6.43E-02,     0.235,
     2          0.401,     0.433,     0.495,     0.541,     0.526,     0.579,
     3          0.574,     0.605,     0.661,     0.709/
C
C    PANCREAS
C
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      DATA ORG15/    6.19E-04, 3.11E-03, 9.56E-03, 4.22E-02,     0.170,
     2         0.365,     0.422,     0.444,     0.483,     0.487,     0.556,
     3         0.589,     0.621,     0.665,     0.695/
C
C    SKELETON
C
      DATA ORG16/    1.36E-03, 8.36E-03, 2.98E-02,     0.156,     0.603,
     2         0.890,     0.765,     0.650,     0.646,     0.627,     0.699,
     3         0.707,     0.735,     0.781,     0.815/
C
C    SKIN
C
      DATA ORG17/        0.177,     0.257,     0.334,     0.491,     0.707,
     2         0.807,     0.811,     0.850,     0.908,     0.885,     0.980,
     3         0.961,     0.973,      1.01,      1.03/
C
C    SPLEEN
C
      DATA ORG18/    2.39E-04, 2.09E-03, 9.09E-03, 5.66E-02,     0.245,
     2         0.460,     0.492,     0.504,     0.541,     0.541,     0.611,
     3         0.634,     0.659,     0.694,     0.719/
C
C    STOMACH
C
      DATA ORG19/    2.16E-04, 2.20E-03, 1.03E-02, 6.43E-02,     0.260,
     2         0.460,     0.488,     0.509,     0.552,     0.546,     0.623,
     3         0.662,     0.689,     0.711,     0.719/
C
C    TESTES
C
      DATA ORG20/    7.69E-03, 3.36E-02, 9.15E-02,     0.277,     0.588,
     2         0.757,     0.739,     0.744,     0.785,     0.774,     0.865,
     3         0.898,     0.928,     0.964,     0.984/
C
C    THYMUS
C
      DATA ORG21/    1.77E-07, 1.43E-04, 5.22E-03,     0.107,     0.410,
     2         0.582,     0.564,     0.562,     0.630,     0.617,     0.683,
     3         0.709,     0.751,     0.802,     0.835/
C
C    THYROID
C
      DATA ORG22/    5.30E-04, 6.86E-03, 3.42E-02,     0.186,     0.541,
     2         0.754,     0.713,     0.688,     0.751,     0.726,     0.798,
     3         0.799,     0.838,     0.893,     0.933/
C
C    UTERUS
C
      DATA ORG23/    7.73E-08, 4.02E-06, 5.32E-04, 2.90E-02,     0.198,
     2         0.398,     0.437,     0.451,     0.488,     0.502,     0.579,
     3         0.580,     0.596,     0.642,     0.680/
C
C    TOTAL BODY
C
      DATA ORG24/    1.06E-02, 3.16E-02, 6.71E-02,     0.160,     0.418,
     2         0.582,     0.582,     0.593,     0.633,     0.627,     0.706,
     3         0.718,     0.735,     0.767,     0.789/
C
```

```
C DEFINE EQUIVALENT TWO-DIMENSIONAL ARRAY OF RATIOS
C
      EQUIVALENCE (ORG(1,1), ORG1(1)), (ORG(1,2), ORG2(1)), (ORG(1,3),
     2 ORG3(1)), (ORG(1,4), ORG4(1)), (ORG(1,5), ORG5(1)), (ORG(1,6),
     3 ORG6(1)), (ORG(1,7), ORG7(1)), (ORG(1,8), ORG8(1)), (ORG(1,9),
     4 ORG9(1)), (ORG(1,10), ORG10(1)), (ORG(1,11), ORG11(1)),
     5 (ORG(1,12), ORG12(1)), (ORG(1,13), ORG13(1)), (ORG(1,14),
     6 ORG14(1)), (ORG(1,15), ORG15(1)), (ORG(1,16), ORG16(1)),
     7 (ORG(1,17), ORG17(1)), (ORG(1,18), ORG18(1)), (ORG(1,19),
     8 ORG19(1)), (ORG(1,20), ORG20(1)), (ORG(1,21), ORG21(1)),
     9 (ORG(1,22), ORG22(1)), (ORG(1,23), ORG23(1)), (ORG(1,24),
     A ORG24(1))
C
      IF (E .GT. EORG(1)) GO TO 2
C
C CALCULATE RATIO OF ORGAN DOSE RATE TO DOSE RATE IN AIR USING LINEAR
C   INTERPOLATION FOR ENERGIES LESS THAN 10 KEV
C
      FAC=(E/EORG(1))*ORG(1,K)
      GO TO 3
C
C CALCULATE LOGARITHMS OF REFERENCE ENERGIES AND REFERENCE RATIOS FOR PARTICULAR
C   ORGAN
C
    2 DO 1 I=1,15
      EORGL(I)=ALOG(EORG(I))
      ORGF(I)=ALOG(ORG(I,K))
    1 CONTINUE
C
C CALCULATE RATIO USING CUBIC INTERPOLATION OF LOGARITHMS
C
      FAC=EXP(YINTER(ALOG(E), EORGL, ORGF, 0, 4, 15))
    3 RETURN
      END
```

```
C
      FUNCTION E1(FM, X)
C
C CALCULATES EXPONENTIAL INTEGRALS USING POLYNOMIAL AND RATIONAL APPROXIMATIONS:
C    SEE HANDBOOK OF MATHEMATICAL FUNCTIONS, PG. 231
C
      DOUBLE PRECISION ARG, AL0, AL1, AL2, AL3, AL4, AL5
      DOUBLE PRECISION AG1, AG2, AG3, AG4, B1, B2, B3, B4
      DOUBLE PRECISION DNUM, DNOM, FM, X, E1
      DATA AL0, AL1, AL2, AL3, AL4, AL5/ -0.57721566D0, 0.99999193D0,
     2 -0.24991055D0, 0.05519968D0, -0.00976004D0, 0.00107857D0/
      DATA AG1, AG2, AG3, AG4/ 8.5733287401D0, 18.0590169730D0,
     2 8.6347608925D0, 0.2677737343D0/
      DATA B1, B2, B3, B4/ 9.5733223454D0, 25.6329561486D0,
     2 21.0996530827D0, 3.9584969228D0/
      ARG=FM*X
      IF (ARG .GT. 1.0D0) GO TO 1
      E1=AL0+AL1*ARG+AL2*(ARG**2.)+AL3*(ARG**3.)+AL4*(ARG**4.)+AL5*
     2 (ARG**5.)-DLOG(ARG)
    2 RETURN
    1 DNUM=ARG**4.+AG1*(ARG**3.)+AG2*(ARG**2.)+AG3*ARG+AG4
      DNOM=ARG**4.+B1*(ARG**3.)+B2*(ARG**2.)+B3*ARG+B4
      E1=DNUM/(DNOM*ARG*DEXP(ARG))
      GO TO 2
      END
```

```
C
      SUBROUTINE BSPEC (EN, FI, EBSR, ATNO, NCD, FIE, JSPEC, EMID)
C
C CALCULATES NUMBER OF ELECTRONS AS A FUNCTION OF ENERGY FOR CONTINUOUS SPECTRA
C   FROM BETA DECAY, BASED ON EQS. (3.12)-(3.14), (3.22) FROM EVANS, THE ATOMIC
C   NUCLEUS
C
C   EN - ENDPOINT ENERGY FOR CONTINUOUS SPECTRUM
C   FI - TOTAL INTENSITY FOR CONTINUOUS SPECTRUM
C   EBSR - ARRAY OF ENERGIES FOR CALCULATION OF CONTINUOUS SPECTRUM
C   ATNO - ATOMIC NUMBER OF PARENT RADIONUCLIDE
C   NCD - INDEX FOR TYPE OF ELECTRON
C       = 1 FOR BETA PARTICLE (-1 FOR FIRST-FORBIDDEN UNIQUE TRANSITION)
C       = 2 FOR POSITRON (-2 FOR FIRST-FORBIDDEN UNIQUE TRANSITION)
C   FIE - ARRAY OF ELECTRON INTENSITIES AT ENERGIES GIVEN BY ALTERNATE VALUES OF
C         EBSR
C   JSPEC - INDEX SPECIFYING HIGHEST FULL ENERGY INTERVAL CENTERED AT AN
C           ALTERNATE VALUE OF EBSR FOR WHICH INTENSITY IS NON-ZERO
C   EMID - ENERGY SPECIFYING LAST ENERGY INTERVAL IN SPECTRUM INCLUDING ENDPOINT
C
      DIMENSION EBSR(1), FIE(1), FIBS(1201), ELOW(3), FLOW(3)
      COMPLEX*16 Z1, DCGAM, GAM
C
C ELECTRON REST MASS IN MEV
C FINE-STRUCTURE CONSTANT
C
      DATA EMC, FSC/ 0.510976, 7.29729E-03/
C
C DEFINE FUNCTIONS FOR CONTINUOUS ELECTRON SPECTRUM
C
C   STATISTICAL FACTOR FOR ALLOWED SPECTRUM
C
      F0(W, ETA, W0)=W*ETA*((W0-W)**2.)
C
C   FIRST-FORBIDDEN UNIQUE CORRECTION FACTOR
C
      F1(W, ETA, W0)=ETA**2.+(W0-W)**2.
C
C   COULOMB CORRECTION FACTOR
C
      FC(ETA, S, Y, GAMSQ)=(ETA**(2.*S))*EXP(3.14159*Y)*GAMSQ
C
C INITIALIZE STATISTICAL FACTORS AND NUMBER OF ELECTRONS AS A FUNCTION OF ENERGY
C
      DO 10 I=1,1201
      FIBS(I)=0.0
      IF (I .GT. 600) GO TO 10
      FIE(I)=0.0
   10 CONTINUE
C
C CALCULATE ATOMIC NUMBER OF DAUGHTER NUCLIDE
C
      IF (IABS(NCD) .EQ. 1) ZD=ATNO+1.
      IF (IABS(NCD) .EQ. 2) ZD=-(ATNO+1.)
C
C CALCULATE STATISTICAL FACTOR FOR ELECTRON SPECTRUM AT ENERGIES GIVEN BY VALUES
```

```
C     OF VARIABLE EBSP: CALCULATE INTEGRAL OF STATISTICAL FACTORS USING
C     TRAPEZOIDAL RULE
C
C     INITIALIZE INTEGRAL AND SET FIRST-FORBIDDEN UNIQUE CORRECTION FACTOR FOR AN
C       ALLOWED TRANSITION
C
        AREA=0.0
        F1C=1.0
C
C     CALCULATE ENDPOINT ENERGY IN UNITS OF ELECTRON REST MASS
C
        W0=EN/EM0+1.
C
C     CALCULATE CONSTANT TERM IN COULOMB CORRECTION FACTOR
C
        S=SQRT(1.-(ABS(ZD)*FSC)**2.)-1.
C
C     CALCULATE STATISTICAL FACTORS AS A FUNCTION OF ENERGY
C
        DO 1 I=2,1201
        IF (EBSP(I) .GT. EN) GO TO 2
C
C       CALCULATE ELECTRON TOTAL ENERGY AND MOMENTUM
C
        W=EBSP(I)/EM0+1.
        ETA=SQRT(W*W-1.)
C
C       CALCULATE FIRST-FORBIDDEN UNIQUE CORRECTION FACTOR
C
        IF (NCD .LT. 0) F1C=F1(W, ETA, W0)
C
C       CALCULATE TERMS IN COULOMB CORRECTION FACTOR
C
        Y=ZD*FSC*W/ETA
        Z1=DCMPLX(DBLE(1.+S), DBLE(Y))
        GAM=DCGAM(Z1)
        GAMSQ=GAM*DCONJG(GAM)
C
C       CALCULATE STATISTICAL FACTOR
C
        FIBS(I)=F0(W, ETA, W0)*F1C*FC(ETA, S, Y, GAMSQ)
      1 CONTINUE
C
C       SET INDEX FOR LAST ENTRY IN ENERGY AND STATISTICAL FACTOR ARRAYS
C
      2 NSPEC=I-1
C
C       CALCULATE STATISTICAL FACTOR AT ZERO ENERGY USING QUADRATIC EXTRAPOLATION
C
        DO 3 I=1,3
        ELOW(I)=EBSP(I+1)
        FLOW(I)=FIBS(I+1)
      3 CONTINUE
        FIBS(1)=YINTER(EBSP(1), ELOW, FLOW, 0, 3, 3)
C
C     CALCULATE INTEGRAL OF STATISTICAL FACTORS
C
        DO 4 I=2,NSPEC
      AREA=AREA+0.5*(FIBS(I)+FIBS(I-1))*(EBSR(I)-EBSR(I-1))
    4 CONTINUE
C
C      ADD CONTRIBUTION FROM ENERGY INTERVAL CONTAINING ENDPOINT ENERGY
C
      AREA=AREA+0.5*FIBS(NSPEC)*(EN-EBSR(NSPEC))
C
C CALCULATE NUMBER OF ELECTRONS PER DISINTEGRATION AT ENERGIES GIVEN BY
C   ALTERNATE VALUES OF EBSR USING SIMPSON'S RULE
C
C   CALCULATE INTERVAL WIDTH AND SPECIFY INDEX FOR ENERGY FOR LAST FULL INTERVAL
C
      DELEN=EBSR(2)-EBSR(1)
      JSPEC=NSPEC-1
C
C   CALCULATE SPECTRUM
C
      DO 5 I=2,JSPEC,2
      DAREA=DELEN*(FIBS(I-1)+FIBS(I+1)+4.*FIBS(I))/3.
      J=I/2
      FIE(J)=FI*DAREA/AREA
    5 CONTINUE
C
C   CALCULATE CONTRIBUTION TO SPECTRUM FROM ENERGY INTERVAL CONTAINING ENDPOINT
C     ENERGY BY BISECTING INTERVAL AND USING SIMPSON'S RULE
C
      IF (I .EQ. JSPEC) GO TO 6
      EMID=(EBSR(JSPEC)+EN)/2.
      FBMID=YINTER(EMID, EBSR, FIBS, 0, 3, NSPEC)
      DAREA=(EN-EMID)*(FIBS(JSPEC)+4.*FBMID)/3.
      GO TO 7
    6 EMID=(EBSR(NSPEC)+EN)/2.
      FBMID=YINTER(EMID, EBSR, FIBS, 0, 3, NSPEC)
      DAREA=(EN-EMID)*(FIBS(NSPEC)+4.*FBMID)/3.
    7 FIE(J+1)=FI*DAREA/AREA
      RETURN
      END
```

```
C
      SUBROUTINE BGRND (EB, RNGAR, R, RANGE, EINT)
C
C CALCULATES THE INTEGRAL OVER THE GROUND SURFACE OF THE ELECTRON SCALED POINT
C   KERNEL IN AIR FOR A PARTICULAR ENERGY AND DISTANCE ABOVE GROUND
C
C   EB - ELECTRON ENERGY FOR EVALUATION OF INTEGRAL
C   RNGAR - REFERENCE ARRAY OF ELECTRON RANGES IN AIR IN G/(SQUARE CM) AT
C            ENERGIES GIVEN BY VALUES OF EBR BELOW
C   R - DISTANCE ABOVE GROUND FOR EVALUATION OF INTEGRAL IN G/(SQUARE CM)
C   RANGE - ELECTRON RANGE IN AIR IN G/(SQUARE CM) FOR ENERGY EB
C   EINT - VALUE OF INTEGRAL OVER THE GROUND SURFACE OF THE ELECTRON SCALED
C           POINT KERNEL FOR ENERGY EB AND DISTANCE ABOVE GROUND R
C
      DIMENSION RNGAR(1), EAR(8), ALPHAR(8), EARL(8)
      DIMENSION REDISR(25), EBR(25), SPKR1(25), SPKR2(25), SPKR3(25),
     2 SPKR4(25), SPKR5(25), SPKR6(25), SPKR7(25), SPKR8(25), SPKR9(25),
     3 SPKR10(25), SPKR11(25), SPKR12(25), SPKR13(25), SPKR14(25),
     4 SPKR15(25), SPKR16(25), SPKR17(25), SPKR18(25), SPKR19(25),
     5 SPKR20(25), SPKR21(25), SPKR22(25), SPKR23(25), SPKR24(25),
     6 SPKR25(25), SPKR(25,25)
      DIMENSION ALPHER(25), FAIRR(25,25), RINTZE(25,23), DISR(23)
C
C RATIOS OF DISTANCE FROM SOURCE POINT TO ELECTRON RANGE FOR REFERENCE VALUES OF
C   ELECTRON SCALED POINT KERNELS
C
      DATA RECISR/  0.0, 0.05, 0.10, 0.15, 0.20, 0.25, 0.30, 0.35, 0.40,
     2 0.45, 0.50, 0.55, 0.60, 0.65, 0.70, 0.75, 0.80, 0.85, 0.90, 0.95,
     3 1.00, 1.05, 1.10, 1.15, 1.20/
C
C ENERGIES FOR REFERENCE VALUES OF ELECTRON RANGES AND SCALED POINT KERNELS
C
      DATA EBR/     0.010,    0.015,    0.020,    0.030,    0.040,    0.050,
     2        0.060,    0.080,    0.100,    0.150,    0.200,    0.300,    0.400,
     3        0.500,    0.600,    0.800,      1.0,      1.5,      2.0,      3.0,
     4          4.0,      5.0,      6.0,      8.0,     10.0/
C
C REFERENCE VALUES OF ELECTRON SCALED POINT KERNELS IN WATER
C
C   REDISR=0.0
C
      DATA SPKR1/   0.508,    0.508,    0.510,    0.521,    0.528,    0.536,
     2        0.544,    0.559,    0.572,    0.595,    0.611,    0.640,    0.660,
     3        0.674,    0.689,    0.714,    0.736,    0.711,    0.798,    0.826,
     4        0.835,    0.841,    0.841,    0.839,    0.833/
C
C   REDISR=0.05
C
      DATA SPKR2/   0.588,    0.582,    0.576,    0.579,    0.582,    0.586,
     2        0.592,    0.603,    0.612,    0.633,    0.648,    0.674,    0.690,
     3        0.708,    0.727,    0.752,    0.774,    0.811,    0.834,    0.856,
     4        0.868,    0.875,    0.877,    0.873,    0.867/
C
C   REDISR=0.10
C
      DATA SPKR3/   0.663,    0.654,    0.648,    0.643,    0.640,    0.640,
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     2       0.640,    0.645,    0.648,    0.661,    0.678,    0.702,    0.725,
     3       0.744,    0.757,    0.784,    0.807,    0.845,    0.866,    0.891,
     4       0.900,    0.905,    0.906,    0.903,    0.897/
C
C    REDISR=0.15
C
      DATA SPKR4/    0.733,    0.717,    0.705,    0.696,    0.690,    0.690,
     2       0.688,    0.691,    0.692,    0.703,    0.718,    0.745,    0.765,
     3       0.784,    0.795,    0.820,    0.835,    0.871,    0.894,    0.913,
     4       0.924,    0.929,    0.930,    0.925,    0.917/
C
C    REDISP=0.20
C
      DATA SPKP5/    0.803,    0.781,    0.769,    0.754,    0.746,    0.740,
     2       0.740,    0.741,    0.744,    0.757,    0.770,    0.791,    0.807,
     3       0.821,    0.832,    0.860,    0.867,    0.897,    0.920,    0.941,
     4       0.950,    0.949,    0.948,    0.941,    0.936/
C
C    REDISR=0.25
C
      DATA SPKP6/    0.894,    0.869,    0.855,    0.834,    0.820,    0.814,
     2       0.810,    0.809,    0.808,    0.820,    0.828,    0.845,    0.855,
     3       0.865,    0.876,    0.892,    0.905,    0.935,    0.952,    0.967,
     4       0.970,    0.967,    0.966,    0.957,    0.948/
C
C    REDISR=0.30
C
      DATA SPKP7/    0.990,    0.967,    0.954,    0.932,    0.920,    0.912,
     2       0.906,    0.901,    0.899,    0.898,    0.903,    0.908,    0.912,
     3       0.919,    0.924,    0.936,    0.949,    0.969,    0.980,    0.979,
     4       0.978,    0.976,    0.972,    0.963,    0.958/
C
C    REDISR=0.35
C
      DATA SPKP8/    1.084,    1.062,    1.050,    1.032,    1.022,    1.010,
     2       1.009,    1.005,    1.003,    0.998,    0.997,    0.996,    0.994,
     3       0.995,    1.010,    1.012,    1.003,    1.007,    1.010,    1.007,
     4       1.002,    0.996,    0.992,    0.980,    0.964/
C
C    REDISR=0.40
C
      DATA SPKP9/    1.195,    1.172,    1.162,    1.151,    1.145,    1.140,
     2       1.134,    1.131,    1.131,    1.123,    1.108,    1.113,    1.109,
     3       1.104,    1.099,    1.088,    1.083,    1.071,    1.062,    1.043,
     4       1.028,    1.010,    1.000,    0.986,    0.976/
C
C    REDISP=0.45
C
      DATA SPKP10/   1.305,    1.281,    1.271,    1.273,    1.285,    1.290,
     2       1.292,    1.294,    1.296,    1.292,    1.283,    1.268,    1.256,
     3       1.247,    1.231,    1.211,    1.196,    1.157,    1.134,    1.093,
     4       1.066,    1.046,    1.032,    1.010,    0.988/
C
C    REDISP=0.50
C
      DATA SPKR11/   1.399,    1.391,    1.389,    1.403,    1.417,    1.424,
     2       1.428,    1.430,    1.432,    1.426,    1.428,    1.405,    1.395,
     3       1.384,    1.372,    1.355,    1.378,    1.285,    1.232,    1.161,
     4      1.119,    1.090,    1.065,    1.032,    1.004/
C
C    REDISR=0.55
C
      DATA SPKR12/  1.472,    1.475,    1.479,    1.503,    1.525,    1.550,
     2      1.556,    1.562,    1.561,    1.557,    1.536,    1.522,    1.507,
     3      1.498,    1.484,    1.457,    1.435,    1.380,    1.325,    1.248,
     4      1.193,    1.149,    1.119,    1.066,    1.024/
C
C    REDISR=0.60
C
      DATA SPKR13/  1.504,    1.519,    1.540,    1.578,    1.607,    1.622,
     2      1.628,    1.638,    1.645,    1.643,    1.639,    1.622,    1.604,
     3      1.579,    1.563,    1.529,    1.501,    1.438,    1.393,    1.318,
     4      1.259,    1.211,    1.173,    1.110,    1.054/
C
C    REDISR=0.65
C
      DATA SPKR14/  1.476,    1.503,    1.528,    1.582,    1.609,    1.624,
     2      1.634,    1.644,    1.649,    1.653,    1.651,    1.638,    1.622,
     3      1.605,    1.587,    1.555,    1.529,    1.472,    1.423,    1.360,
     4      1.303,    1.257,    1.217,    1.147,    1.086/
C
C    REDISR=0.70
C
      DATA SPKR15/  1.395,    1.425,    1.449,    1.479,    1.501,    1.516,
     2      1.528,    1.546,    1.557,    1.563,    1.558,    1.544,    1.534,
     3      1.522,    1.510,    1.489,    1.475,    1.440,    1.413,    1.358,
     4      1.313,    1.275,    1.242,    1.179,    1.124/
C
C    REDISR=0.75
C
      DATA SPKR16/  1.241,    1.274,    1.299,    1.315,    1.323,    1.328,
     2      1.336,    1.342,    1.348,    1.354,    1.359,    1.361,    1.358,
     3      1.351,    1.346,    1.339,    1.334,    1.319,    1.313,    1.290,
     4      1.265,    1.249,    1.226,    1.181,    1.136/
C
C    REDISR=0.80
C
      DATA SPKR17/  1.048,    1.074,    1.090,    1.090,    1.084,    1.080,
     2      1.076,    1.073,    1.073,    1.073,    1.072,    1.071,    1.071,
     3      1.070,    1.067,    1.064,    1.067,    1.077,    1.088,    1.111,
     4      1.125,    1.126,    1.131,    1.130,    1.102/
C
C    REDISR=0.85
C
      DATA SPKR18/  0.803,    0.819,    0.815,    0.796,    0.780,    0.768,
     2      0.764,    0.757,    0.752,    0.743,    0.740,    0.735,    0.735,
     3      0.736,    0.739,    0.742,    0.748,    0.765,    0.782,    0.842,
     4      0.900,    0.945,    0.962,    0.986,    0.998/
C
C    REDISR=0.90
C
      DATA SPKR19/  0.548,    0.558,    0.552,    0.523,    0.506,    0.492,
     2      0.484,    0.469,    0.461,    0.446,    0.438,    0.429,    0.425,
     3      0.422,    0.424,    0.427,    0.431,    0.455,    0.481,    0.552,
     4      0.609,    0.654,    0.694,    0.756,    0.803/
C
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C     REDISR=0.95
C
        DATA SPKR20/  0.329,     0.339,     0.335,     0.313,     0.290,     0.274,
       2      0.264,     0.248,     0.237,     0.219,     0.213,     0.193,     0.189,
       3      0.185,     0.183,     0.184,     0.191,     0.206,     0.230,     0.273,
       4      0.311,     0.352,     0.388,     0.465,     0.542/
C
C     REDISR=1.00
C
        DATA SPKR21/  0.179,     0.185,     0.181,     0.164,     0.148,     0.134,
       2      0.126,     0.114,     0.100,     0.086,     0.076,     0.066,     0.060,
       3      0.058,     0.056,     0.056,     0.058,     0.066,     0.078,     0.104,
       4      0.129,     0.155,     0.181,     0.235,     0.295/
C
C     REDISR=1.05
C
        DATA SPKR22/  0.070,     0.072,     0.073,     0.074,     0.072,     0.070,
       2      0.066,     0.058,     0.042,     0.026,     0.020,     0.014,     0.012,
       3      0.010,     0.010,     0.009,     0.008,     0.008,     0.013,     0.020,
       4      0.028,     0.036,     0.045,     0.067,     0.098/
C
C     REDISR=1.10
C
        DATA SPKR23/  0.024,     0.023,     0.021,     0.019,     0.016,     0.015,
       2      0.013,     0.011,     0.009,     0.007,     0.005,     0.003,     0.002,
       3      0.002,     0.002,     0.001,     0.001,     0.001,     0.002,     0.003,
       4      0.005,     0.008,     0.012,     0.018,     0.025/
C
C     REDISR=1.15
C
        DATA SPKR24/  0.000,     0.000,     0.000,     0.000,     0.000,     0.000,
       2      0.000,     0.000,     0.000,     0.000,     0.000,     0.000,     0.000,
       3      0.000,     0.000,     0.000,     0.000,     0.000,     0.000,     0.001,
       4      0.001,     0.002,     0.003,     0.006,     0.008/
C
C     REDISR=1.20
C
        DATA SPKR25/  0.000,     0.000,     0.000,     0.000,     0.000,     0.000,
       2      0.000,     0.000,     0.000,     0.000,     0.000,     0.000,     0.000,
       3      0.000,     0.000,     0.000,     0.000,     0.000,     0.000,     0.000,
       4      0.000,     0.000,     0.000,     0.001,     0.003/
C
C ENERGIES FOR REFERENCE VALUES OF SCALING PARAMETER
C
        DATA EAR/    0.010, 0.020, 0.050, 0.100, 0.200, 0.500,   1.0,
       2        2.0/
C
C REFERENCE VALUES OF SCALING PARAMETER TO CONVERT ELECTRON SCALED POINT KERNELS
C    IN WATER TO VALUES IN AIR
C
        DATA ALPHAR/ 1.025, 1.023, 1.022, 1.021, 1.021, 1.022, 1.020,
       2      1.014/
C
C DEFINE EQUIVALENT TWO-DIMENSIONAL ARRAY OF ELECTRON SCALED POINT KERNELS IN
C    WATER
C
        EQUIVALENCE (SPKR(1,1), SPKR1(1)), (SPKR(1,2), SPKR2(1)),
       2 (SPKR(1,3), SPKR3(1)), (SPKR(1,4), SPKR4(1)), (SPKR(1,5),
     3 SPKR5(1)), (SPKR(1,6), SPKR6(1)), (SPKR(1,7), SPKR7(1)),
     4 (SPKR(1,8), SPKR8(1)), (SPKR(1,9), SPKR9(1)), (SPKR(1,10),
     5 SPKR10(1)), (SPKR(1,11), SPKR11(1)), (SPKR(1,12), SPKR12(1)),
     6 (SPKR(1,13), SPKR13(1)), (SPKR(1,14), SPKR14(1)), (SPKR(1,15),
     7 SPKR15(1)), (SPKR(1,16), SPKR16(1)), (SPKR(1,17), SPKR17(1)),
     8 (SPKR(1,18), SPKR18(1)), (SPKR(1,19), SPKR19(1)), (SPKR(1,20),
     9 SPKR20(1)), (SPKR(1,21), SPKR21(1)), (SPKR(1,22), SPKR22(1)),
     A (SPKR(1,23), SPKR23(1)), (SPKR(1,24), SPKR24(1)), (SPKR(1,25),
     B SPKR25(1))
C
      LOGICAL FIRST/ .TRUE./
C
C TEST FOR FIRST TIME THROUGH SUBROUTINE
C
      IF (.NOT. FIRST) GO TO 1
C
C CALCULATE TWO-DIMENSIONAL REFERENCE ARRAY OF INTEGRALS OVER THE GROUND SURFACE
C   OF THE ELECTRON SCALED POINT KERNEL IN AIR AT ENERGIES GIVEN BY VALUES OF
C   EBR AND LOWER LIMITS OF INTEGRATION GIVEN BY VALUES OF REDISR
C
C   CALCULATE SCALING PARAMETERS TO CONVERT SCALED POINT KERNELS IN WATER TO
C     VALUES IN AIR AT ENERGIES GIVEN BY EBR; USE LOGARITHM OF ENERGIES EAR FOR
C     INTERPOLATION
C
      DO 2 I=1,8
      EARL(I)=ALOG(EAR(I))
    2 CONTINUE
      DO 3 I=1,25
      ALPHER(I)=YINTER(ALOG(EBR(I)), EARL, ALPHAR, 0, 3, 8)
    3 CONTINUE
C
C   CALCULATE TWO-DIMENSIONAL ARRAY OF SCALED POINT KERNELS IN AIR
C
      DO 4 I=1,25
      DO 5 J=1,25
      IF (J .LE. 23) GO TO 10
C
C     SCALED POINT KERNELS IN AIR ARE TAKEN EQUAL TO VALUES IN WATER AT TWO
C       LARGEST DISTANCES
C
      FAIRR(I,J)=SPKR(I,J)
      GO TO 5
C
C     CALCULATE SCALED DISTANCE IN AIR
C
   10 ATR=ALPHER(I)*REDISR(J)
C
C     CALCULATE SCALED POINT KERNEL IN AIR
C
      FAIRR(I,J)=ALPHER(I)*DINTER(EBR(I), ATR, EBR, REDISR, SPKR, 25,
     2 24, 4, 25)
    5 CONTINUE
    4 CONTINUE
C
C   CALCULATE INTEGRALS AT EACH ENERGY USING SIMPSON'S RULE
C
      DO 6 I=1,25
C
```

```
C     CALCULATE INTEGRALS AT REDISR=0.05, 0.15, 0.25, ..., 1.15
C
      DO 7 J=2,24,2
C
C       INITIALIZE INNER TERMS IN SIMPSON'S RULE
C
      T2=0.0
      T3=0.0
C
C       CALCULATE OUTER TERM ASSUMING SCALED POINT KERNEL IS ZERO AT REDISR=1.25
C
      T1=FAIRR(I,J)/REDISR(J)
C
C       CALCULATE INNER TERMS
C
      J1=J+1
      DO 8 K=J1,25,2
      T2=T2+FAIRR(I,K)/REDISR(K)
    8 CONTINUE
      IF (J .EQ. 24) GO TO 11
      J2=J+2
      DO 9 K=J2,24,2
      T3=T3+FAIRR(I,K)/REDISR(K)
    9 CONTINUE
C
C       REDEFINE INDEX FOR VARIABLE REDISR SO THAT VALUE IS ONE AT REDISR=0.05
C
   11 K=J-1
C
C       COMBINE TERMS TO OBTAIN INTEGRAL; INTERVAL WIDTH IS 0.05
C
      RINTZE(I,K)=0.05*(T1+4.0*T2+2.0*T3)/3.
    7 CONTINUE
C
C     CALCULATE INTEGRALS AT REDISR=0.10, 0.20, 0.30, ..., 1.10 USING SAME
C       PROCEDURE AS ABOVE, EXCEPT FOR ASSUMPTION FOR OUTER TERM
C
      DO 12 J=3,23,2
      T2=0.0
      T3=0.0
      T1=FAIRR(I,J)/REDISR(J)+FAIRR(I,25)/REDISR(25)
      J1=J+1
      DO 13 K=J1,24,2
      T2=T2+FAIRR(I,K)/REDISR(K)
   13 CONTINUE
      IF (J .EQ. 23) GO TO 14
      J2=J+2
      DO 15 K=J2,23,2
      T3=T3+FAIRR(I,K)/REDISR(K)
   15 CONTINUE
   14 K=J-1
      RINTZE(I,K)=0.05*(T1+4.0*T2+2.0*T3)/3.
   12 CONTINUE
    6 CONTINUE
C
C DEFINE NEW REFERENCE ARRAY OF SCALED DISTANCES CORRESPONDING TO LOWER LIMITS
C   OF INTEGRATION FOR WHICH REFERENCE INTEGRALS WERE CALCULATED; RESET LOGICAL
C   VARIABLE
```

```
C
      DO 16 I=1,23
      DISR(I)=REDISR(I+1)
   16 CONTINUE
      FIRST=.FALSE.
C
C CALCULATE ELECTRON RANGE IN AIR AT ENERGY EB IN G/(SQUARE CM)
C
    1 RANGE=YINTER(EB, EBR, RNGAR, 0, 3, 25)
C
C CALCULATE INTEGRAL OVER GROUND SURFACE FOR ENERGY EB AND DISTANCE ABOVE GROUND
C   R
C
      TLOWER=R/RANGE
      EINT=DINTER(EB, TLOWER, EBR, DISR, RINTZE, 25, 23, 4, 25)
      IF (EINT .LT. 0.0) EINT=0.0
      RETURN
      END
```

```
C
      FUNCTION DINTER(XX, YY, X, Y, Z, NX, NY, M, ID)
C
C PERFORMS LAGRANGIAN INTERPOLATION OF A FUNCTION OF TWO VARIABLES
C
C BASED ON DOUBLE PRECISION INTERPOLATION FUNCTION DLAG DESCRIBED IN UNION
C    CARBIDE PUBLICATION CTC-39
C
C    XX - ABCISSA OF DESIRED INTERPOLATION POINT
C    YY - ORDINATE OF DESIRED INTERPOLATION POINT
C    X - SINGLY DIMENSIONED ARRAY OF ABCISSAS
C    Y - SINGLY DIMENSIONED ARRAY OF ORDINATES
C    Z - DOUBLY DIMENSIONED ARRAY OF FUNCTION VALUES GIVEN BY Z(I,J)=
C         F(X(I),Y(J))
C    NX - NUMBER OF ELEMENTS FOR THE X-ARRAY
C    NY - NUMBER OF ELEMENTS FOR THE Y-ARRAY
C    M - NUMBER OF POINTS IS M*M FOR THE INTERPOLATION
C    ID - FIRST DIMENSION OF Z IN CALLING PROGRAM
C
      DIMENSION Z(ID,1), X(1), Y(1), XLAG(100)
      LOGICAL QUITX, QUITY
C
C INITIALIZE
C
      QUITX=.FALSE.
      QUITY=.FALSE.
      M1=M
      IEXTX=0
      IEXTY=0
C
C FIND THE RANGE OF INTERPOLATION ALONG X
C
      IF (M1 .LE. NX) GO TO 10
      M1=NX
   10 DO 20 I=1,NX
      IF (XX-X(I)) 30, 90, 20
   20 CONTINUE
      IEXTX=1
      GO TO 80
   30 MIDX=I
      IF (MIDX .GT. 1) GO TO 40
      IEXTX=-1
      GO TO 50
   40 IF (ABS(XX-X(MIDX)) .GE. ABS(XX-X(MIDX-1))) GO TO 50
      ISXPT=MIDX-(M1/2)
      GO TO 60
   50 ISXPT=MIDX-((M1+1)/2)
   60 IF (ISXPT .GT. 0) GO TO 70
      ISXPT=1
   70 IEXPT=ISXPT+M1-1
      IF (IEXPT .LE. NX) GO TO 100
   80 ISXPT=NX-M1+1
      IEXPT=NX
      GO TO 100
   90 QUITX=.TRUE.
C
```

```
C FIND THE RANGE OF INTERPOLATION ALONG Y
C
  100 M1=M
      IF (M1 .LE. NY) GO TO 110
      M1=NY
  110 DO 120 J=1,NY
      IF (YY-Y(J)) 130, 190, 120
  120 CONTINUE
      IEXTY=1
      GO TO 180
  130 MIDY=J
      IF (MIDY .GT. 1) GO TO 140
      IEXTY=-1
      GO TO 150
  140 IF (ABS(YY-Y(MIDY)) .GE. ABS(YY-Y(MIDY-1))) GO TO 150
      ISYPT=MIDY-(M1/2)
      GO TO 160
  150 ISYPT=MIDY-((M1+1)/2)
  160 IF (ISYPT .GT. 0) GO TO 170
      ISYPT=1
  170 IEYPT=ISYPT+M1-1
      IF (IEYPT .LE. NY) GO TO 200
  180 ISYPT=NY-M1+1
      IEYPT=NY
      GO TO 200
  190 QUITY=.TRUE.
  200 IF (QUITX .AND. QUITY) GO TO 270
      IF (QUITX .AND. .NOT. QUITY) GO TO 240
      IF (.NOT. QUITX .AND. QUITY) GO TO 230
C
C INTERPOLATE ALONG X
C
  210 DO 220 K=ISYPT,IEYPT
  220 CALL INTER (XX, Z(1,K), X, ISXPT, IEXPT, XLAG(K))
      GO TO 260
  230 CALL INTER (XX, Z(1,J), X, ISXPT, IEXPT, XLAG(J))
      DINTER=XLAG(J)
      GO TO 280
C
C INTERPOLATE ALONG Y
C
  240 DO 250 L=ISYPT,IEYPT
  250 XLAG(L)=Z(I,L)
  260 CALL INTER (YY, XLAG, Y, ISYPT, IEYPT, YLAG)
      DINTER=YLAG
      GO TO 280
  270 DINTER=Z(I,J)
  280 RETURN
      END
```

```
C
      SUBROUTINE INTER (PT, FUN, ORD, ISPT, IEPT, ALAG)
C
C AN INTERPOLATION ROUTINE DESCRIBED IN UNION CARBIDE PUBLICATION CTC-39
C
      DIMENSION FUN(1), ORD(1)
      SUM=0.0
      PROD=1.
      DO 30 J=ISPT,IEPT
      PROD=PROD*(PT-ORD(J))
      DENOM=1.
      DO 20 K=ISPT,IEPT
      IF (K .NE. J) GO TO 10
      D=PT
      GO TO 20
   10 D=ORD(J)
   20 DENOM=DENOM*(D-ORD(K))
   30 SUM=SUM+FUN(J)/DENOM
      ALAG=SUM*PROD
      RETURN
      END
```

```
C
      FUNCTION DCGAM(Z)
C
C CALCULATES GAMMA FUNCTIONS OF A COMPLEX ARGUMENT USING A SERIES EXPANSION: SEE
C    HANDBOOK OF MATHEMATICAL FUNCTIONS, PG. 256
C
      COMPLEX*16 Z, SUM, DCGAM
      DOUBLE PRECISION C(26)
      DATA C/ 1.0, 5.772156649015329D-01, -6.558780715202538D-01,
     2 -4.200263503409520D-02, 1.665386113822915D-01,
     3 -4.219773455554430D-02, -9.621971527877000D-03, 7.218943246663000D-03,
     4 -1.165167591859100D-03, -2.152416741149D-04, 1.280502823882D-04,
     5 -2.013485478070D-05, -1.250493482100D-06, 1.133027232000D-06,
     6 -2.056338417D-07, 6.11609500D-09, 5.00200750D-09, -1.18127460D-09,
     7 1.0434270D-10, 7.78230D-12, -3.69680D-12, 5.1000D-13, -2.060D-14,
     8 -5.40D-15, 1.40D-15, 1.0D-16/
      SUM=0.0D0
      DO 1 I=1,26
      SUM=SUM+C(I)*(Z**I)
    1 CONTINUE
      DCGAM=1.0D0/SUM
      RETURN
      END
```

```
C
      SUBROUTINE DOSOUT
C
C WRITES DOSE-RATE CONVERSION FACTORS IN TABLES AND ON PUNCHED CARDS
C
      DIMENSION INUCL(2), THALF(3)
      DIMENSION DOSE(9), DOSORG(3,24), DOSORB(3,5), DOSSKN(3)
      COMMON/ BLK1/ INUCL, THALF
      COMMON/ BLK5/ DOSF, DOSORG, DOSORB, DOSSKN
C
C MAXIMUM NUMBER OF LINES PER PAGE FOR EACH TYPE OF DOSE-RATE CONVERSION FACTOR
C   TABLE
C
      DATA MAXLDF/49/, MAXLOF/25/, MAXSKN/49/, MAXSKT/49/
C
      LOGICAL FIRST/ .TRUE./
C
C TEST FOR FIRST TIME THROUGH SUBROUTINE
C
      IF (.NOT. FIRST) GO TO 1
C
C INITIALIZE LINE COUNT FOR EACH TABLE AND RESET LOGICAL VARIABLE
C
      LINDF=0
      LINORG=0
      LINSKN=0
      LINSKT=0
      FIRST=.FALSE.
C
C WRITE DOSE-RATE CONVERSION FACTORS IN TABLES
C
C   BODY-SURFACE DOSE-RATE CONVERSION FACTORS FOR AIR IMMERSION, WATER
C     IMMERSION, AND GROUND SURFACE EXPOSURE
C
    1 WRITE (15,2) INUCL, THALF, DOSE(1), DOSE(4), DOSE(7)
    2 FORMAT (1H , 4X, 2A4, 5X, 3A4, 6X, 1PE10.2, 4(8X, 1PE10.2))
      WRITE (21,2) INUCL, THALF, DOSE(2), DOSE(5), DOSE(8)
      WRITE (27,2) INUCL, THALF, DOSE(3), DOSE(6), DOSE(9)
      LINDF=LINDF+1
      IF (LINDF .LT. MAXLDF) GO TO 3
      CALL PRINT (6)
      LINDF=0
C
C   PHOTON ORGAN DOSE-RATE CONVERSION FACTORS FOR THREE EXPOSURE MODES
C
    3 WRITE (16,4) INUCL, THALF, (DOSORG(1,J), J=1,8)
    4 FORMAT (1H0, 2A4, 1X, 3A4, 11(1PE11.2))
      WRITE (17,4) INUCL, THALF, (DOSORG(1,J), J=9,16)
      WRITE (18,4) INUCL, THALF, (DOSORG(1,J), J=17,24)
      WRITE (22,4) INUCL, THALF, (DOSORG(2,J), J=1,8)
      WRITE (23,4) INUCL, THALF, (DOSORG(2,J), J=9,16)
      WRITE (24,4) INUCL, THALF, (DOSORG(2,J), J=17,24)
      WRITE (28,4) INUCL, THALF, (DOSORG(3,J), J=1,8)
      WRITE (29,4) INUCL, THALF, (DOSORG(3,J), J=9,16)
      WRITE (30,4) INUCL, THALF, (DOSORG(3,J), J=17,24)
      LINORG=LINORG+1
      IF (LINORG .LT. MAXLOF) GO TO 5
      CALL PRINT (7)
      LINORG=0
C
C   ELECTRON SKIN DOSE-RATE CONVERSION FACTORS FOR THREE EXPOSURE MODES
C
    5 WRITE (19,2) INUCL, THALF, (DOSORB(1,J), J=1,3), DOSORB(1,5),
     2 DOSORB(1,4)
      WRITE (25,2) INUCL, THALF, (DOSORB(2,J), J=1,3), DOSORB(2,5),
     2 DOSORB(2,4)
      WRITE (31,2) INUCL, THALF, (DOSORB(3,J), J=1,3), DOSORB(3,5),
     2 DOSORB(3,4)
      LINSKN=LINSKN+1
      IF (LINSKN .LT. MAXSKN) GO TO 11
      CALL PRINT (8)
      LINSKN=0
C
C   PHOTON, ELECTRON, AND TOTAL DOSE-RATE CONVERSION FACTORS FOR SKIN FOR THREE
C     EXPOSURE MODES
C
   11 WRITE (20,2) INUCL, THALF, DOSORG(1,17), DOSORB(1,4), DOSSKN(1)
      WRITE (26,2) INUCL, THALF, DOSORG(2,17), DOSORB(2,4), DOSSKN(2)
      WRITE (32,2) INUCL, THALF, DOSORG(3,17), DOSORB(3,4), DOSSKN(3)
      LINSKT=LINSKT+1
      IF (LINSKT .LT. MAXSKT) GO TO 9
      CALL PRINT (9)
      LINSKT=0
C
C WRITE DOSE-RATE CONVERSION FACTORS ON PUNCHED CARDS
C
C   RADIONUCLIDE IDENTIFICATION
C
    9 WRITE (7,6) INUCL, THALF
    6 FORMAT (2A6, 2X, 3A4)
C
C   PHOTON, ELECTRON, AND TOTAL BODY-SURFACE DOSE-RATE CONVERSION FACTORS FOR
C     THREE EXPOSURE MODES
C
      WRITE (7,7) DOSE(1), DOSE(4), DOSE(7)
    7 FORMAT (8(1PE10.2))
      WRITE (7,7) DOSE(2), DOSE(5), DOSE(8)
      WRITE (7,7) DOSE(3), DOSE(6), DOSE(9)
C
C   PHOTON ORGAN DOSE-RATE CONVERSION FACTORS FOR THREE EXPOSURE MODES
C
      DO 8 I=1,3
      WRITE (7,7) (DOSORG(I,J), J=1,24)
    8 CONTINUE
C
C   ELECTRON SKIN DOSE-RATE CONVERSION FACTORS FOR THREE EXPOSURE MODES
C
      DO 10 I=1,3
      WRITE (7,7) (DOSORB(I,J), J=1,3), DOSORB(I,5), DOSORB(I,4)
   10 CONTINUE
C
C   PHOTON, ELECTRON, AND TOTAL DOSE-RATE CONVERSION FACTORS FOR SKIN FOR THREE
C     EXPOSURE MODES
C
```

```
      DO 12 I=1,3
      WRITE (7,7) DOSORG(I,17), DOSORB(I,4), DOSSKN(I)
   12 CONTINUE
      RETURN
      END
```

APPENDIX B

TABULATION OF EXTERNAL DOSE-RATE CONVERSION FACTORS

A tabulation of the dose-rate conversion factors for external exposure to photons and electrons calculated for the 496 radionuclides of potential importance in environmental radiological assessments is given on the following pages. Dose-rate factors for immersion in contaminated air are given first, followed by the values for immersion in contaminated water, and then exposure to a contaminated ground surface. For each exposure mode, the dose-rate factors for photons and electrons at the body surface are given first, followed by photon dose-rate factors for the 24 body organs, electron dose-rate factors for radiosensitive tissues of the skin, and a table summarizing the photon and electron dose-rate factors for skin.

The user of these results should note that possible contributions from radioactive daughter products are not included in the tabulated values for any of the radionuclides. We also note that for a few radionuclides, all photon and electron dose-rate factors are zero; these radionuclides emit only alpha particles in their decay. All dose-rate factors also assume exposure for 100% of the time. Particularly for water immersion, the user should reduce the dose-rate factors by an appropriate amount based on a more realistic exposure time. For this exposure mode, it is reasonable to assume exposure for 1% of the time.

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED AIR

DOSE RATE AT BODY SURFACE FOR AIR CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
H-3	12.28 Y	0.0	1.41E-02	1.41E-02
BE-7	53.44 D	1.15E-01	0.0	1.15E-01
BE-10	1.6E6 Y	0.0	4.91E-01	4.91E-01
C-11	20.48 M	2.36E 00	9.29E-01	3.29E 00
C-14	5.73E3 Y	0.0	1.21E-01	1.21E-01
N-13	9.97 M	2.36E 00	1.18E 00	3.54E 00
N-16	7.13 S	1.06E 01	6.40E 00	1.70E 01
O-15	122.24 S	2.36E 00	1.76E 00	4.13E 00
F-18	109.74 M	2.29E 00	5.85E-01	2.87E 00
NA-22	2.602 Y	5.10E 00	4.71E-01	5.57E 00
NA-24	15.00 H	9.62E 00	1.33E 00	1.10E 01
MG-27	9.458 M	2.07E 00	1.68E 00	3.76E 00
MG-28	20.91 H	3.19E 00	3.91E-01	3.58E 00
AL-26	7.2E5 Y	6.23E 00	1.07E 00	7.30E 00
AL-28	2.240 M	4.16E 00	2.96E 00	7.12E 00
SI-31	157.3 M	2.07E-03	1.43E 00	1.43E 00
SI-32	3.3E2 Y	0.0	1.58E-01	1.58E-01
P-32	14.29 D	0.0	1.67E 00	1.67E 00
P-33	25.4 D	0.0	1.86E-01	1.86E-01
S-35	87.44 D	0.0	1.19E-01	1.19E-01
CL-36	3.01E5 Y	3.23E-06	6.03E-01	6.03E-01
CL-38	37.21 M	3.48E 00	3.65E 00	7.12E 00
AR-37	35.02 D	4.53E-04	4.81E-03	5.26E-03
AR-39	269 Y	0.0	5.30E-01	5.30E-01
AR-41	1.827 H	2.99E 00	1.12E 00	4.11E 00
K-40	1.277E9 Y	3.64E-01	1.09E 00	1.46E 00
K-42	12.36 H	6.44E-01	3.42E 00	4.06E 00
K-43	22.6 H	2.24E 00	7.37E-01	2.98E 00
CA-41	1.03E5 Y	8.31E-04	5.65E-03	6.48E-03
CA-45	162.7 D	9.37E-10	1.88E-01	1.88E-01
CA-47	4.536 D	2.48E 00	8.31E-01	3.31E 00
CA-49	8.719 M	7.38E 00	2.09E 00	9.47E 00
SC-44	3.927 H	4.97E 00	1.44E 00	6.40E 00
SC-46	83.80 D	4.68E 00	2.72E-01	4.95E 00
SC-46M	18.72 S	2.00E-01	1.28E-01	3.28E-01
SC-47	3.422 D	2.43E-01	3.96E-01	6.39E-01
SC-48	43.67 H	7.80E 00	5.33E-01	8.34E 00
SC-49	57.4 M	2.44E-03	1.97E 00	1.98E 00
TI-44	47.3 Y	3.01E-01	2.64E-02	3.27E-01
TI-45	3.08 H	2.02E 00	8.99E-01	2.91E 00
TI-51	5.752 M	8.47E-01	2.07E 00	2.92E 00
V-48	15.971 D	6.78E 00	3.57E-01	7.14E 00
V-49	330 D	1.81E-03	8.42E-03	1.02E-02
V-52	3.75 M	3.37E 00	2.55E 00	5.93E 00
CR-49	42.09 M	2.41E 00	1.44E 00	3.85E 00
CR-51	27.704 D	7.45E-02	8.92E-03	8.34E-02
MN-52	5.591 D	8.05E 00	1.79E-01	8.22E 00
MN-52M	21.4 M	5.60E 00	2.70E 00	8.31E 00
MN-53	3.7E6 Y	2.79E-03	9.44E-03	1.22E-02

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED AIR

DOSE RATE AT BODY SURFACE FOR AIR CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
MN-54	312.7 D	1.94E 00	9.44E-03	1.95E 00
MN-56	2.5785 H	3.94E 00	1.98E 00	5.93E 00
MN-57	1.47 M	1.71E-01	2.66E 00	2.83E 00
FE-52	8.275 H	1.69E 00	4.78E-01	2.17E 00
FE-55	2.7 Y	3.37E-03	9.89E-03	1.33E-02
FE-59	44.63 D	2.77E 00	2.85E-01	3.06E 00
CO-56	78.76 D	8.41E 00	2.97E-01	8.71E 00
CO-57	270.9 D	2.77E-01	4.50E-02	3.22E-01
CO-58	70.80 D	2.27E 00	8.16E-02	2.35E 00
CO-58M	9.15 H	4.10E-03	6.07E-02	6.48E-02
CO-60	5.271 Y	5.84E 00	2.33E-01	6.08E 00
CO-60M	10.47 M	1.44E-02	1.38E-01	1.52E-01
CO-61	1.650 H	2.00E-01	1.13E 00	1.33E 00
NI-56	6.10 D	3.98E 00	1.60E-02	4.00E 00
NI-57	36.08 H	4.47E 00	3.45E-01	4.81E 00
NI-59	7.5E4 Y	4.82E-03	1.07E-02	1.55E-02
NI-63	100.1 Y	0.0	4.21E-02	4.21E-02
NI-65	2.520 H	1.28E 00	1.52E 00	2.80E 00
CU-61	3.408 H	1.91E 00	7.44E-01	2.65E 00
CU-62	9.74 M	2.33E 00	3.07E 00	5.40E 00
CU-64	12.701 H	4.41E-01	2.97E-01	7.38E-01
CU-67	61.88 D	2.59E-01	3.78E-01	6.37E-01
ZN-62	9.26 H	1.05E 00	7.47E-02	1.13E 00
ZN-65	244.4 D	1.36E 00	1.62E-02	1.38E 00
ZN-69	55.6 M	1.38E-05	7.76E-01	7.76E-01
ZN-69M	13.76 H	9.61E-01	5.32E-02	1.01E 00
GA-66	9.40 H	5.78E 00	2.30E 00	8.08E 00
GA-67	3.261 D	3.36E-01	8.13E-02	4.18E-01
GA-68	68.0 M	2.20E 00	1.77E 00	3.97E 00
GA-72	14.1 H	6.31E 00	1.20E 00	7.51E 00
GE-68	288 D	8.41E-03	1.17E-02	2.01E-02
GE-71	11.8 D	8.50E-03	1.18E-02	2.03E-02
GE-77	11.30 H	2.46E 00	1.57E 00	4.03E 00
AS-72	26.0 H	4.14E 00	2.47E 00	6.61E 00
AS-73	80.30 D	3.25E-02	1.47E-01	1.80E-01
AS-74	17.77 D	1.78E 00	6.48E-01	2.42E 00
AS-76	26.32 H	9.98E-01	2.54E 00	3.54E 00
AS-77	38.8 H	1.97E-02	5.54E-01	5.73E-01
SE-73	7.15 H	2.52E 00	9.39E-01	3.46E 00
SE-75	119.78 D	8.90E-01	3.27E-02	9.23E-01
SE-79	6.5E4 Y	0.0	1.27E-01	1.27E-01
BR-77	57.04 H	7.38E-01	1.99E-02	7.58E-01
BR-80	17.4 M	1.74E-01	1.74E 00	1.92E 00
BR-80M	4.42 H	4.93E-02	1.50E-01	1.99E-01
BR-82	35.30 H	6.15E 00	3.31E-01	6.48E 00
BR-83	2.39 H	1.72E-02	7.74E-01	7.91E-01
BR-84	31.80 M	4.17E 00	2.98E 00	7.15E 00
BR-85	172 S	1.54E-01	2.40E 00	2.55E 00
KR-79	35.04 H	5.93E-01	5.73E-02	6.51E-01

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED AIR

DOSE RATE AT BODY SURFACE FOR AIR CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
KR-81	2.1E5 Y	3.52E-02	1.16E-02	4.69E-02
KR-83M	1.83 H	5.22E-03	9.37E-02	9.89E-02
KR-85	10.72 Y	5.16E-03	6.07E-01	6.12E-01
KR-85M	4.48 H	3.55E-01	6.18E-01	9.73E-01
KR-87	76.3 M	1.85E 00	3.16E 00	5.01E 00
KR-88	2.84 H	4.56E 00	8.77E-01	5.44E 00
KR-89	3.16 M	4.27E 00	3.25E 00	7.52E 00
KR-90	32.32 S	2.96E 00	3.14E 00	6.10E 00
RB-81	4.58 H	1.41E 00	5.05E-01	1.91E 00
RB-82	1.25 M	2.53E 00	3.37E 00	5.90E 00
RB-83	86.2 D	1.17E 00	1.73E-02	1.19E 00
RB-84	32.9 D	2.09E 00	3.97E-01	2.49E 00
RB-86	18.66 D	2.20E-01	1.60E 00	1.82E 00
RB-87	4.73E10 Y	0.0	1.91E-01	1.91E-01
RB-88	17.8 M	1.49E 00	4.93E 00	6.42E 00
RB-89	15.44 M	4.82E 00	2.44E 00	7.26E 00
RB-90	157 S	5.03E 00	4.65E 00	9.68E 00
RB-90M	258 S	7.63E 00	3.31E 00	1.09E 01
SR-82	25.0 D	1.60E-02	1.25E-02	2.85E-02
SR-85	64.84 D	1.20E 00	2.02E-02	1.22E 00
SR-85M	67.66 M	4.92E-01	3.03E-02	5.23E-01
SR-87M	2.805 H	7.39E-01	1.60E-01	8.99E-01
SR-89	50.55 D	3.17E-04	1.40E 00	1.40E 00
SR-90	28.6 Y	0.0	4.75E-01	4.75E-01
SR-91	9.5 H	1.60E 00	1.57E 00	3.16E 00
SR-92	2.71 H	3.12E 00	4.85E-01	3.61E 00
SR-93	7.3 M	5.20E 00	2.20E 00	7.41E 00
Y-86	14.74 H	8.36E 00	5.44E-01	8.90E 00
Y-87	80.3 H	1.07E 00	1.61E-02	1.09E 00
Y-88	106.60 D	6.28E 00	1.45E-02	6.29E 00
Y-90	64.1 H	0.0	2.24E 00	2.24E 00
Y-90M	3.19 H	1.46E 00	1.13E-01	1.57E 00
Y-91	58.51 D	8.43E-03	1.45E 00	1.46E 00
Y-91M	49.71 M	1.23E 00	6.48E-02	1.29E 00
Y-92	3.54 H	5.86E-01	3.45E 00	4.04E 00
Y-93	10.1 H	2.07E-01	2.80E 00	3.01E 00
ZR-86	16.5 H	6.66E-01	7.44E-02	7.41E-01
ZR-88	83.4 D	9.01E-01	3.74E-02	9.38E-01
ZR-89	78.43 H	2.69E 00	2.45E-01	2.94E 00
ZR-93	1.53E6 Y	0.0	4.79E-02	4.79E-02
ZR-95	64.02 D	1.71E 00	2.82E-01	1.99E 00
ZR-97	16.90 H	4.20E-01	1.67E 00	2.09E 00
NB-90	14.60 H	9.69E 00	9.55E-01	1.06E 01
NB-91	1E4 Y	2.47E-02	1.32E-02	3.78E-02
NB-91M	61 D	1.17E-01	2.22E-01	3.40E-01
NB-92	3.6E7 Y	3.49E 00	1.62E-02	3.51E 00
NB-92M	10.15 D	2.25E 00	1.28E-02	2.26E 00
NB-93M	14.6 Y	3.95E-03	6.94E-02	7.33E-02
NB-94	2.03E4 Y	3.66E 00	3.57E-01	4.01E 00

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED AIR

DOSE RATE AT BODY SURFACE FOR AIR CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
NB-94M	6.26 M	2.44E-02	8.56E-02	1.10E-01
NB-95	35.06 D	1.78E 00	1.08E-01	1.88E 00
NB-95M	86.6 H	1.49E-01	4.37E-01	5.87E-01
NB-96	23.35 H	5.75E 00	6.09E-01	6.35E 00
NB-97	72.1 M	1.54E 00	1.13E 00	2.67E 00
NB-97M	60 S	1.69E 00	3.45E-02	1.73E 00
MO-91	15.49 M	2.26E 00	3.47E 00	5.74E 00
MO-93	3.5E3 Y	2.17E-02	1.25E-02	3.42E-02
MO-99	66.02 H	3.58E-01	9.56E-01	1.31E 00
MO-101	14.61 M	3.48E 00	1.30E 00	4.78E 00
TC-95	20.0 H	1.85E 00	1.50E-02	1.86E 00
TC-95M	61 D	1.56E 00	3.47E-02	1.59E 00
TC-96	4.28 D	5.82E 00	1.50E-02	5.84E 00
TC-96M	51.5 M	1.09E-01	6.52E-02	1.75E-01
TC-97	2.6E6 Y	2.39E-02	1.28E-02	3.66E-02
TC-97M	89 D	1.96E-02	2.09E-01	2.29E-01
TC-98	4.2E6 Y	3.24E 00	2.93E-01	3.53E 00
TC-99	2.13E5 Y	1.13E-06	2.05E-01	2.05E-01
TC-99M	6.02 H	2.82E-01	3.79E-02	3.20E-01
TC-101	14.2 M	7.87E-01	1.14E 00	1.93E 00
RU-97	2.9 D	5.44E-01	2.92E-02	5.74E-01
RU-103	39.35 D	1.12E 00	1.70E-01	1.29E 00
RU-105	4.44 H	1.82E 00	9.74E-01	2.79E 00
RU-106	368.2 D	0.0	2.48E-02	2.48E-02
RH-103M	56.119 M	3.49E-03	9.08E-02	9.43E-02
RH-105	35.36 H	1.78E-01	3.72E-01	5.50E-01
RH-105M	45 S	7.63E-02	2.49E-01	3.26E-01
RH-106	29.92 S	4.81E-01	3.37E 00	3.86E 00
PD-103	16.961 D	2.95E-02	1.23E-02	4.18E-02
PD-107	6.5E6 Y	0.0	2.30E-02	2.30E-02
PD-109	13.453 H	1.59E-03	8.71E-01	8.73E-01
AG-106M	8.46 D	6.52E 00	1.96E-02	6.54E 00
AG-108	2.37 M	4.10E-02	1.47E 00	1.51E 00
AG-108M	127 Y	3.75E 00	3.45E-02	3.78E 00
AG-109M	39.6 S	2.33E-02	1.84E-01	2.07E-01
AG-110	24.57 S	7.09E-02	2.82E 00	2.89E 00
AG-110M	249.85 D	6.36E 00	1.66E-01	6.52E 00
AG-111	7.46 D	6.05E-02	8.46E-01	9.07E-01
CD-109	464 D	3.03E-02	1.17E-02	4.20E-02
CD-111M	48.7 M	6.50E-01	2.63E-01	9.13E-01
CD-113	9.3E15 Y	0.0	2.26E-01	2.26E-01
CD-113M	13.7 Y	0.0	4.50E-01	4.50E-01
CD-115	53.46 H	4.73E-01	7.57E-01	1.23E 00
CD-115M	44.6 D	5.10E-02	1.46E 00	1.51E 00
CD-117	2.49 H	2.54E 00	1.04E 00	3.59E 00
CD-117M	3.36 H	4.75E 00	4.93E-01	5.24E 00
IN-111	2.83 D	9.15E-01	8.14E-02	9.96E-01
IN-113M	1.658 H	5.98E-01	3.16E-01	9.14E-01
IN-114	71.9 S	7.40E-02	1.85E 00	1.93E 00

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED AIR

DOSE RATE AT BODY SURFACE FOR AIR CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
IN-114M	49.51 D	2.21E-01	3.45E-01	5.66E-01
IN-115	4.6E15 Y	0.0	3.69E-01	3.69E-01
IN-115M	4.36 H	3.78E-01	4.07E-01	7.85E-01
IN-116M	54.15 M	5.73E 00	7.27E-01	6.46E 00
IN-117	43.8 M	1.59E 00	6.45E-01	2.23E 00
IN-117M	116.5 M	2.08E-01	1.04E 00	1.25E 00
SN-113	115.1 D	4.82E-02	1.23E-02	6.05E-02
SN-117M	13.60 D	3.50E-01	3.78E-01	7.28E-01
SN-119M	293.0 D	2.32E-02	1.85E-01	2.08E-01
SN-123	129.2 D	1.61E-02	1.25E 00	1.27E 00
SN-125	9.64 D	7.06E-01	1.93E 00	2.64E 00
SN-126	1.0E5 Y	1.21E-01	2.97E-01	4.19E-01
SB-117	2.80 H	4.13E-01	6.78E-02	4.81E-01
SB-122	2.70 D	1.03E 00	1.35E 00	2.38E 00
SB-124	60.20 D	4.35E 00	9.15E-01	5.27E 00
SB-125	2.77 Y	9.96E-01	2.37E-01	1.23E 00
SB-126	12.4 D	6.39E 00	7.22E-01	7.11E 00
SB-126M	19.0 M	3.64E 00	1.42E 00	5.07E 00
SB-127	3.85 D	1.53E 00	7.62E-01	2.30E 00
SB-129	4.40 H	3.33E 00	8.63E-01	4.19E 00
TE-121	16.8 D	1.33E 00	1.95E-02	1.35E 00
TE-121M	154 D	4.92E-01	1.90E-01	6.82E-01
TE-123	1E13 Y	2.67E-02	9.80E-03	3.65E-02
TE-123M	119.7 D	3.29E-01	2.38E-01	5.67E-01
TE-125M	58 D	7.15E-02	3.03E-01	3.74E-01
TE-127	9.35 H	1.11E-02	5.40E-01	5.52E-01
TE-127M	109 D	2.29E-02	1.94E-01	2.17E-01
TE-129	69.6 M	1.32E-01	1.31E 00	1.45E 00
TE-129M	33.6 D	8.93E-02	6.49E-01	7.38E-01
TE-131	25.0 M	9.66E-01	1.73E 00	2.69E 00
TE-131M	30 H	3.31E 00	4.60E-01	3.77E 00
TE-132	78.2 H	5.19E-01	2.40E-01	7.59E-01
TE-133	12.45 M	2.15E 00	1.97E 00	4.12E 00
TE-133M	55.4 M	5.15E 00	1.70E 00	6.85E 00
TE-134	41.8 M	2.01E 00	3.56E-01	2.37E 00
I-122	3.62 M	2.25E 00	2.48E 00	4.73E 00
I-123	13.13 H	3.84E-01	6.45E-02	4.49E-01
I-124	4.18 D	2.47E 00	4.76E-01	2.94E 00
I-125	60.14 D	8.48E-02	4.23E-02	1.27E-01
I-126	12.93 D	1.08E 00	3.24E-01	1.40E 00
I-128	24.99 M	1.75E-01	1.83E 00	2.00E 00
I-129	1.57E7 Y	5.04E-02	1.33E-01	1.83E-01
I-130	12.36 H	4.96E 00	6.92E-01	5.65E 00
I-131	8.040 D	8.77E-01	4.62E-01	1.34E 00
I-132	2.30 H	5.32E 00	1.18E 00	6.50E 00
I-133	20.8 H	1.41E 00	9.88E-01	2.39E 00
I-134	52.6 M	6.11E 00	1.46E 00	7.57E 00
I-135	6.61 H	3.67E 00	8.90E-01	4.56E 00
I-136	83 S	5.91E 00	4.82E 00	1.07E 01

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED AIR

DOSE RATE AT BODY SURFACE FOR AIR CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
XE-122	20.1 H	1.69E-01	2.02E-02	1.90E-01
XE-123	2.14 H	1.45E 00	4.42E-01	1.89E 00
XE-125	16.8 H	6.05E-01	7.87E-02	6.84E-01
XE-127	36.406 D	6.28E-01	7.34E-02	7.01E-01
XE-129M	8.89 D	1.07E-01	4.41E-01	5.49E-01
XE-131M	11.84 D	4.17E-02	3.46E-01	3.87E-01
XE-133	5.245 D	9.62E-02	3.30E-01	4.26E-01
XE-133M	2.19 D	9.03E-02	4.61E-01	5.52E-01
XE-135	9.11 H	5.66E-01	7.70E-01	1.34E 00
XE-135M	15.36 M	9.96E-01	2.31E-01	1.23E 00
XE-137	3.83 M	4.35E-01	4.22E 00	4.66E 00
XE-138	14.13 M	2.62E 00	1.51E 00	4.13E 00
CS-126	1.64 M	2.61E 00	3.21E 00	5.82E 00
CS-129	32.06 H	6.45E-01	3.45E-02	6.79E-01
CS-131	9.688 D	4.68E-02	1.23E-02	5.91E-02
CS-132	6.475 D	1.65E 00	3.04E-02	1.68E 00
CS-134	2.062 Y	3.61E 00	3.93E-01	4.00E 00
CS-134M	2.90 H	5.86E-02	2.63E-01	3.22E-01
CS-135	2.3E6 Y	0.0	1.37E-01	1.37E-01
CS-136	13.16 D	5.03E 00	3.23E-01	5.36E 00
CS-137	30.17 Y	0.0	4.14E-01	4.14E-01
CS-138	32.2 M	5.50E 00	2.92E 00	8.42E 00
CS-139	9.40 M	7.15E-01	3.95E 00	4.66E 00
BA-131	11.8 D	1.08E 00	1.02E-01	1.18E 00
BA-133	10.5 Y	8.87E-01	1.22E-01	1.01E 00
BA-133M	38.9 H	1.51E-01	5.26E-01	6.77E-01
BA-135M	28.7 H	1.35E-01	4.98E-01	6.34E-01
BA-137M	2.552 M	1.39E 00	1.53E-01	1.54E 00
BA-139	83.1 M	7.95E-02	2.16E 00	2.24E 00
BA-140	12.789 D	4.39E-01	7.36E-01	1.18E 00
BA-141	18.27 M	2.06E 00	2.05E 00	4.11E 00
BA-142	10.70 M	2.10E 00	1.13E 00	3.23E 00
LA-140	40.22 H	5.40E 00	1.28E 00	6.68E 00
LA-141	3.94 H	9.96E-02	2.27E 00	2.37E 00
LA-142	95.4 M	6.34E 00	2.03E 00	8.37E 00
CE-139	137.66 D	3.56E-01	7.67E-02	4.33E-01
CE-141	32.50 D	1.71E-01	4.13E-01	5.83E-01
CE-143	33.0 H	6.22E-01	1.05E 00	1.68E 00
CE-144	284.3 D	4.23E-02	2.25E-01	2.67E-01
PR-142	19.13 H	1.36E-01	1.94E 00	2.08E 00
PR-143	13.56 D	2.07E-08	7.63E-01	7.63E-01
PR-144	17.28 M	7.44E-02	2.88E 00	2.95E 00
PR-144M	7.2 M	2.44E-02	1.10E-01	1.34E-01
ND-147	10.98 D	3.18E-01	6.50E-01	9.67E-01
ND-149	1.73 H	8.71E-01	1.18E 00	2.05E 00
PM-143	265 D	7.22E-01	1.48E-02	7.36E-01
PM-144	363 D	3.60E 00	3.20E-02	3.63E 00
PM-145	17.7 Y	6.64E-02	2.99E-02	9.62E-02
PM-146	2020 D	1.74E 00	2.37E-01	1.98E 00

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED AIR

DOSE RATE AT BODY SURFACE FOR AIR CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
PM-147	2.6234 Y	7.66E-06	1.51E-01	1.51E-01
PM-148	5.37 D	1.34E 00	1.74E 00	3.08E 00
PM-148M	41.3 D	4.62E 00	3.98E-01	5.01E 00
PM-149	53.08 H	2.67E-02	8.81E-01	9.08E-01
PM-151	28.40 H	7.69E-01	7.36E-01	1.51E 00
SM-147	1.069E11 Y	0.0	0.0	0.0
SM-151	90 Y	2.56E-05	4.85E-02	4.86E-02
SM-153	46.7 H	1.32E-01	6.46E-01	7.78E-01
EU-152	13.6 Y	2.67E 00	3.00E-01	2.97E 00
EU-152M	9.32 H	7.30E-01	1.19E 00	1.92E 00
EU-154	8.8 Y	2.91E 00	6.62E-01	3.57E 00
EU-155	4.96 Y	1.31E-01	1.51E-01	2.82E-01
EU-156	15.19 D	3.13E 00	9.94E-01	4.13E 00
GD-152	1.1E14 Y	0.0	0.0	0.0
GD-153	241.6 D	2.36E-01	1.02E-01	3.38E-01
GD-159	18.56 H	9.11E-02	7.63E-01	8.55E-01
GD-162	9.7 M	9.77E-01	8.11E-01	1.79E 00
TB-157	150 Y	1.03E-02	7.77E-03	1.80E-02
TB-160	72.3 D	2.51E 00	6.57E-01	3.17E 00
TB-162	7.76 M	2.54E 00	1.25E 00	3.79E 00
DY-157	8.06 H	7.99E-01	2.57E-02	8.24E-01
DY-165	2.334 H	5.80E-02	1.08E 00	1.13E 00
DY-166	81.6 H	8.52E-02	3.83E-01	4.69E-01
HO-166	26.80 H	6.60E-02	1.67E 00	1.74E 00
HO-166M	1.20E3 Y	3.69E 00	3.51E-01	4.04E 00
ER-169	9.40 D	3.01E-05	2.48E-01	2.48E-01
ER-171	7.52 H	8.46E-01	9.99E-01	1.85E 00
TM-170	128.6 D	1.16E-02	7.97E-01	8.08E-01
TM-171	1.92 Y	1.44E-03	6.25E-02	6.40E-02
YB-169	31.97 D	6.83E-01	2.74E-01	9.57E-01
YB-175	4.19 D	9.02E-02	3.15E-01	4.06E-01
LU-177	6.71 D	7.85E-02	3.57E-01	4.35E-01
LU-177M	160.10 D	2.25E 00	6.32E-01	2.88E 00
HF-181	42.39 D	1.25E 00	4.72E-01	1.72E 00
TA-182	114.74 D	3.01E 00	4.85E-01	3.49E 00
W-181	120.95 D	8.53E-02	1.97E-02	1.05E-01
W-185	75.1 D	5.85E-05	3.08E-01	3.08E-01
W-187	23.83 H	1.10E 00	7.00E-01	1.80E 00
W-188	69.4 D	4.02E-03	2.41E-01	2.45E-01
RE-182	64.0 H	4.04E 00	5.72E-01	4.61E 00
RE-182M	12.7 H	2.77E 00	1.98E-01	2.97E 00
RE-183	70 D	3.40E-01	2.35E-01	5.75E-01
RE-184	38.0 D	2.06E 00	1.19E-01	2.18E 00
RE-184M	169 D	8.87E-01	3.17E-01	1.20E 00
RE-186	90.64 H	4.55E-02	8.22E-01	8.67E-01
RE-187	4.7E10 Y	0.0	1.63E-03	1.63E-03
RE-188	16.98 H	1.32E-01	1.87E 00	2.00E 00
OS-185	93.6 D	1.63E 00	3.02E-02	1.66E 00
OS-186	2.0E15 Y	0.0	0.0	0.0

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DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED AIR

DOSE RATE AT BODY SURFACE FOR AIR CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
OS-190M	9.9 M	3.66E 00	2.68E-01	3.93E 00
OS-191	15.4 D	1.61E-01	3.06E-01	4.67E-01
OS-191M	13.03 H	1.38E-02	1.54E-01	1.68E-01
OS-193	30.0 H	1.54E-01	9.01E-01	1.05E 00
IR-190	11.78 D	3.22E 00	1.46E-01	3.37E 00
IR-190M	1.2 H	4.31E-03	4.74E-02	5.17E-02
IR-190M	3.2 H	1.04E-01	2.81E-02	1.32E-01
IR-192	74.02 D	1.88E 00	5.21E-01	2.40E 00
IR-193M	11.9 D	4.91E-03	1.78E-01	1.83E-01
IR-194	19.15 H	2.10E-01	1.94E 00	2.15E 00
IR-194M	171 D	5.40E 00	3.72E-01	5.77E 00
PT-191	2.71 D	6.55E-01	1.51E-01	8.05E-01
PT-193	50 Y	4.20E-03	8.00E-03	1.22E-02
PT-193M	4.33 D	2.72E-02	3.12E-01	3.39E-01
PT-195M	4.02 D	1.62E-01	4.14E-01	5.76E-01
PT-197	18.3 H	5.41E-02	6.11E-01	6.65E-01
PT-197M	94.4 M	1.87E-01	7.60E-01	9.47E-01
AU-194	39.5 H	2.50E 00	7.86E-02	2.58E 00
AU-195	183 D	1.84E-01	1.04E-01	2.87E-01
AU-195M	30.6 S	4.57E-01	2.68E-01	7.25E-01
AU-196	6.183 D	1.08E 00	7.75E-02	1.16E 00
AU-198	2.696 D	9.34E-01	7.90E-01	1.72E 00
AU-199	3.139 D	1.99E-01	3.44E-01	5.43E-01
HG-197	64.14 H	1.51E-01	1.46E-01	2.97E-01
HG-197M	23.8 H	2.07E-01	5.04E-01	7.12E-01
HG-203	46.60 D	5.21E-01	2.60E-01	7.81E-01
TL-200	26.1 H	3.05E 00	7.40E-02	3.12E 00
TL-201	73.06 H	2.02E-01	8.70E-02	2.89E-01
TL-202	12.23 D	1.07E 00	4.45E-02	1.12E 00
TL-204	3.779 Y	2.43E-03	5.76E-01	5.78E-01
TL-207	4.77 M	5.05E-03	1.19E 00	1.19E 00
TL-208	3.053 M	7.86E 00	1.42E 00	9.27E 00
TL-209	2.20 M	4.92E 00	1.65E 00	6.57E 00
TL-210	1.30 M	6.42E 00	1.72E 00	8.14E 00
PB-203	52.02 H	6.87E-01	1.35E-01	8.22E-01
PB-204M	66.9 M	4.84E 00	2.38E-01	5.08E 00
PB-205	1.51E7 Y	4.73E-03	6.54E-03	1.13E-02
PB-209	3.253 H	0.0	4.79E-01	4.79E-01
PB-210	22.26 Y	9.25E-03	8.43E-02	9.36E-02
PB-211	36.1 M	1.18E-01	1.09E 00	1.21E 00
PB-212	10.643 H	3.34E-01	4.20E-01	7.54E-01
PB-214	26.8 M	5.70E-01	7.01E-01	1.27E 00
BI-206	6.243 D	7.60E 00	2.90E-01	7.89E 00
BI-207	33.4 Y	3.57E 00	2.63E-01	3.83E 00
BI-208	3.68E5 Y	6.17E 00	2.03E-02	6.19E 00
BI-210	5.013 D	0.0	9.39E-01	9.39E-01
BI-211	2.13 M	1.09E-01	2.36E-02	1.32E-01
BI-212	60.55 M	4.28E-01	1.12E 00	1.55E 00
BI-213	45.65 M	3.21E-01	1.06E 00	1.38E 00

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED AIR

DOSE RATE AT BODY SURFACE FOR AIR CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
BI-214	19.9 M	3.52E 00	1.54E 00	5.06E 00
PO-209	102 Y	7.98E-03	2.36E-03	1.03E-02
PO-210	138.378 D	1.98E-05	0.0	1.98E-05
PO-211	0.516 S	1.80E-02	0.0	1.80E-02
PO-212	2.98E-7 S	0.0	0.0	0.0
PO-213	4.2E-6 S	7.08E-05	0.0	7.08E-05
PO-214	1.637E-4 S	1.94E-04	0.0	1.94E-04
PO-215	1.778E-3 S	3.44E-04	0.0	3.44E-04
PO-216	0.146 S	3.37E-05	0.0	3.37E-05
PO-218	3.05 M	0.0	0.0	0.0
AT-211	7.214 H	8.46E-02	7.34E-03	9.20E-02
AT-217	0.0323 S	5.51E-04	0.0	5.51E-04
RN-218	0.035 S	1.75E-03	0.0	1.75E-03
RN-219	3.96 S	1.31E-01	1.51E-02	1.46E-01
RN-220	55.61 S	1.21E-03	0.0	1.21E-03
RN-222	3.8235 D	9.01E-04	0.0	9.01E-04
FR-221	4.8 M	6.99E-02	2.27E-02	9.26E-02
FR-223	21.8 M	1.19E-01	9.20E-01	1.04E 00
RA-222	38.0 S	2.11E-02	1.72E-03	2.28E-02
RA-223	11.434 D	3.03E-01	1.73E-01	4.76E-01
RA-224	3.62 D	2.28E-02	5.29E-03	2.81E-02
RA-225	14.8 D	2.97E-02	2.55E-01	2.84E-01
RA-226	1600 Y	1.52E-02	8.38E-03	2.36E-02
RA-228	5.75 Y	8.41E-09	2.86E-02	2.86E-02
AC-225	10.0 D	3.42E-02	5.32E-02	8.74E-02
AC-227	21.773 Y	5.67E-04	3.03E-02	3.09E-02
AC-228	6.13 H	2.15E 00	1.04E 00	3.19E 00
TH-226	30.9 M	1.88E-02	4.76E-02	6.64E-02
TH-227	18.718 D	2.47E-01	9.44E-02	3.42E-01
TH-228	1.9132 Y	6.58E-03	4.63E-02	5.29E-02
TH-229	7.34E3 Y	2.07E-01	2.43E-01	4.50E-01
TH-230	7.7E4 Y	2.90E-03	3.14E-02	3.43E-02
TH-231	25.52 H	4.93E-02	3.78E-01	4.27E-01
TH-232	1.405E10 Y	2.45E-03	2.66E-02	2.90E-02
TH-233	22.3 M	8.03E-02	9.99E-01	1.08E 00
TH-234	24.10 D	1.95E-02	1.41E-01	1.61E-01
PA-230	17.4 D	1.53E 00	1.31E-01	1.66E 00
PA-231	3.276E4 Y	8.27E-02	8.71E-02	1.70E-01
PA-233	27.0 D	4.93E-01	4.66E-01	9.60E-01
PA-234	6.70 H	4.55E 00	1.21E 00	5.76E 00
PA-234M	1.17 M	2.65E-02	1.98E 00	2.00E 00
U-230	20.8 D	5.54E-03	4.71E-02	5.27E-02
U-231	4.2 D	1.77E-01	1.40E-01	3.18E-01
U-232	72 Y	3.64E-03	3.51E-02	3.88E-02
U-233	1.592E5 Y	1.49E-03	7.36E-03	8.85E-03
U-234	2.445E5 Y	3.01E-03	2.76E-02	3.06E-02
U-235	7.038E8 Y	3.42E-01	1.03E-01	4.45E-01
U-236	2.3415E7 Y	2.79E-03	2.34E-02	2.62E-02
U-237	6.75 D	3.17E-01	4.45E-01	7.62E-01

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED AIR

DOSE RATE AT BODY SURFACE FOR AIR CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
U-238	4.468E9 Y	2.46E-03	2.08E-02	2.33E-02
U-239	23.40 M	1.08E-01	9.86E-01	1.09E 00
U-240	14.1 H	1.37E-02	3.73E-01	3.87E-01
NP-235	396.1 D	1.42E-02	7.30E-03	2.15E-02
NP-236	1.15E6 Y	3.16E-01	4.79E-01	7.95E-01
NP-236M	22.5 H	1.18E-01	2.00E-01	3.19E-01
NP-237	2.14E6 Y	7.03E-02	1.53E-01	2.23E-01
NP-238	2.117 D	1.29E 00	6.15E-01	1.90E 00
NP-239	2.355 D	3.84E-01	5.91E-01	9.76E-01
NP-240	65 M	2.69E 00	1.05E 00	3.74E 00
NP-240M	7.4 M	7.73E-01	1.48E 00	2.25E 00
PU-236	2.851 Y	3.70E-03	2.61E-02	2.98E-02
PU-237	45.3 D	1.16E-01	2.12E-02	1.38E-01
PU-238	87.75 Y	3.25E-03	2.02E-02	2.35E-02
PU-239	24131 Y	1.34E-03	1.20E-02	1.33E-02
PU-240	6537 Y	3.09E-03	2.04E-02	2.35E-02
PU-241	14.4 Y	0.0	1.29E-02	1.29E-02
PU-242	3.758E5 Y	2.57E-03	1.68E-02	1.93E-02
PU-243	4.956 H	5.40E-02	4.14E-01	4.68E-01
PU-244	8.26E7 Y	2.21E-03	1.41E-02	1.63E-02
PU-245	10.57 H	9.64E-01	7.75E-01	1.74E 00
PU-246	10.85 D	2.25E-01	1.32E-01	3.57E-01
AM-241	432.2 Y	5.89E-02	7.20E-02	1.31E-01
AM-242	16.02 H	3.83E-02	4.22E-01	4.60E-01
AM-242M	152 Y	9.56E-03	8.81E-02	9.77E-02
AM-243	7.38E3 Y	1.25E-01	6.19E-02	1.87E-01
AM-244	10.1 H	1.88E 00	7.79E-01	2.66E 00
AM-245	122.4 M	7.19E-02	6.92E-01	7.64E-01
AM-246	25.0 M	2.28E 00	1.10E 00	3.38E 00
CM-242	163.2 D	3.39E-03	1.85E-02	2.19E-02
CM-243	28.5 Y	2.96E-01	2.99E-01	5.95E-01
CM-244	18.11 Y	3.02E-03	1.58E-02	1.88E-02
CM-245	8.5E3 Y	1.68E-01	1.70E-01	3.39E-01
CM-246	4.75E3 Y	2.69E-03	1.49E-02	1.76E-02
CM-247	1.56E7 Y	7.31E-01	3.58E-02	7.66E-01
CM-248	3.39E5 Y	2.14E-03	1.17E-02	1.38E-02
CM-249	64.15 M	4.36E-02	6.66E-01	7.09E-01
CM-250	6.9E3 Y	0.0	3.11E-03	3.11E-03
BK-249	320 D	0.0	8.07E-02	8.07E-02
BK-250	3.222 H	2.06E 00	7.10E-01	2.77E 00
BK-251	57.0 M	0.0	8.71E-01	8.71E-01
CF-248	333.5 D	2.42E-03	1.09E-02	1.33E-02
CF-249	350.6 Y	7.62E-01	9.13E-02	8.53E-01
CF-250	13.08 Y	2.42E-03	1.09E-02	1.34E-02
CF-251	9.0E2 Y	2.71E-01	3.86E-01	6.57E-01
CF-252	2.639 Y	2.25E-03	1.04E-02	1.26E-02
CF-253	17.81 D	4.09E-05	1.92E-01	1.92E-01
CF-254	60.5 D	4.43E-08	0.0	4.43E-08
ES-253	20.467 D	2.08E-03	5.12E-03	7.20E-03

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED AIR

DOSE RATE AT BODY SURFACE FOR AIR CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
ES-254	275.7 D	3.68E-02	1.19E-01	1.55E-01
ES-254M	39.3 H	1.31E 00	4.89E-01	1.80E 00
ES-255	39.8 D	1.78E-04	1.72E-01	1.72E-01
FM-254	3.240 H	2.57E-03	1.05E-02	1.31E-02
FM-255	20.07 H	2.29E-02	2.06E-01	2.29E-01
FM-256	157.6 M	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
H-3	12.28 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BE-7	53.44 D	5.78E-02	5.47E-02	6.08E-02	7.33E-02	5.34E-02	4.80E-02	5.67E-02	5.24E-02
BE-10	1.6E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C-11	20.48 M	1.19E 00	1.13E 00	1.26E 00	1.50E 00	1.10E 00	9.91E-01	1.17E 00	1.08E 00
C-14	5.73E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N-13	9.97 M	1.19E 00	1.13E 00	1.26E 00	1.50E 00	1.10E 00	9.92E-01	1.17E 00	1.08E 00
N-16	7.13 S	6.60E 00	6.68E 00	7.07E 00	8.50E 00	6.57E 00	6.30E 00	7.03E 00	6.59E 00
O-15	122.24 S	1.19E 00	1.13E 00	1.26E 00	1.50E 00	1.10E 00	9.93E-01	1.17E 00	1.08E 00
F-18	109.74 M	1.15E 00	1.09E 00	1.22E 00	1.45E 00	1.07E 00	9.61E-01	1.13E 00	1.05E 00
NA-22	2.602 Y	2.57E 00	2.51E 00	2.82E 00	3.21E 00	2.47E 00	2.26E 00	2.63E 00	2.43E 00
NA-24	15.00 H	5.33E 00	5.47E 00	6.08E 00	6.86E 00	5.46E 00	5.11E 00	5.80E 00	5.38E 00
MG-27	9.458 M	1.09E 00	1.05E 00	1.19E 00	1.33E 00	1.04E 00	9.44E-01	1.11E 00	1.02E 00
MG-28	20.91 H	1.61E 00	1.59E 00	1.78E 00	2.02E 00	1.57E 00	1.44E 00	1.67E 00	1.54E 00
AL-26	7.2E5 Y	3.28E 00	3.29E 00	3.68E 00	4.17E 00	3.26E 00	3.01E 00	3.47E 00	3.20E 00
AL-28	2.240 M	2.22E 00	2.27E 00	2.55E 00	2.83E 00	2.26E 00	2.11E 00	2.41E 00	2.22E 00
SI-31	157.3 M	1.05E-03	1.04E-03	1.17E-03	1.30E-03	1.03E-03	9.49E-04	1.10E-03	1.01E-03
SI-32	3.3E2 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-32	14.29 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-33	25.4 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S-35	87.44 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CL-36	3.01E5 Y	8.24E-10	1.49E-16	6.57E-11	6.45E-08	1.07E-10	1.38E-12	2.04E-12	3.38E-10
CL-38	37.21 M	1.93E 00	1.97E 00	2.20E 00	2.45E 00	1.97E 00	1.83E 00	2.09E 00	1.93E 00
AR-37	35.02 D	1.31E-07	2.37E-14	1.05E-08	1.03E-05	1.71E-08	2.21E-10	3.25E-10	5.39E-08
AR-39	269 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AR-41	1.827 M	1.51E 00	1.51E 00	1.70E 00	1.88E 00	1.49E 00	1.38E 00	1.59E 00	1.46E 00

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
H-3	12.28 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BE-7	53.44 D	5.67E-02	5.44E-02	5.84E-02	6.80E-02	5.99E-02	5.20E-02	4.68E-02	6.91E-02
BE-10	1.6E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C-11	20.48 M	1.17E 00	1.12E 00	1.20E 00	1.39E 00	1.23E 00	1.08E 00	9.65E-01	1.41E 00
C-14	5.73E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N-13	9.97 M	1.17E 00	1.12E 00	1.20E 00	1.39E 00	1.23E 00	1.08E 00	9.65E-01	1.41E 00
N-16	7.13 S	7.46E 00	6..5E 00	6.83E 00	7.17E 00	7.41E 00	5.99E 00	6.14E 00	7.26E 00
O-15	122.24 S	1.17E 00	1.12E 00	1.20E 00	1.39E 00	1.23E 00	1.08E 00	9.66E-01	1.41E 00
F-18	109.74 M	1.13E 00	1.09E 00	1.17E 00	1.34E 00	1.19E 00	1.04E 00	9.35E-01	1.36E 00
NA-22	2.602 Y	2.63E 00	2.50E 00	2.66E 00	2.91E 00	2.70E 00	2.39E 00	2.16E 00	2.96E 00
NA-24	15.00 H	5.89E 00	5.49E 00	5.75E 00	5.91E 00	5.87E 00	4.95E 00	4.81E 00	6.01E 00
MG-27	9.458 M	1.10E 00	1.05E 00	1.12E 00	1.20E 00	1.13E 00	1.02E 00	9.04E-01	1.22E 00
MG-28	20.91 H	1.67E 00	1.58E 00	1.68E 00	1.80E 00	1.70E 00	1.51E 00	1.37E 00	1.83E 00
AL-26	7.2E5 Y	3.48E 00	3.29E 00	3.49E 00	3.71E 00	3.53E 00	3.06E 00	2.86E 00	3.77E 00
AL-28	2.240 M	2.42E 00	2.28E 00	2.40E 00	2.47E 00	2.42E 00	2.10E 00	1.98E 00	2.52E 00
SI-31	157.3 M	1.09E-03	1.04E-03	1.10E-03	1.16E-03	1.11E-03	9.89E-04	9.00E-04	1.18E-03
SI-32	3.3E2 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-32	14.29 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-33	25.4 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S-35	87.44 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CL-36	3.01E5 Y	9.88E-13	8.01E-12	6.52E-10	3.91E-10	2.14E-10	3.23E-10	4.81E-10	1.06E-09
CL-38	37.21 M	2.10E 00	1.98E 00	2.08E 00	2.13E 00	2.10E 00	1.80E 00	1.72E 00	2.17E 00
AR-37	35.02 D	1.57E-10	1.28E-09	1.04E-07	6.23E-08	3.41E-08	5.14E-08	7.67E-08	1.69E-07
AR-39	269 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AR-41	1.827 H	1.59E 00	1.50E 00	1.59E 00	1.67E 00	1.61E 00	1.43E 00	1.30E 00	1.70E 00

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
H-3	12.28 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BE-7	53.44 D	8.96E-02	5.32E-02	5.37E-02	7.85E-02	5.92E-02	7.26E-02	4.76E-02	6.26E-02
BE-10	1.6E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C-11	20.48 M	1.85E 00	1.09E 00	1.11E 00	1.61E 00	1.22E 00	1.50E 00	9.79E-01	1.29E 00
C-14	5.73E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N-13	9.97 M	1.85E 00	1.09E 00	1.11E 00	1.62E 00	1.22E 00	1.50E 00	9.80E-01	1.29E 00
N-16	7.13 S	9.59E 00	6.50E 00	6.78E 00	9.14E 00	7.42E 00	8.28E 00	5.89E 00	7.24E 00
O-15	122.24 S	1.85E 00	1.10E 00	1.11E 00	1.62E 00	1.22E 00	1.50E 00	9.81E-01	1.29E 00
F-18	109.74 M	1.79E 00	1.06E 00	1.07E 00	1.57E 00	1.19E 00	1.45E 00	9.49E-01	1.25E 00
NA-22	2.602 Y	4.05E 00	2.43E 00	2.46E 00	3.53E 00	2.76E 00	3.32E 00	2.29E 00	2.84E 00
NA-24	15.00 H	8.37E 00	5.27E 00	5.41E 00	7.49E 00	5.91E 00	6.86E 00	4.93E 00	6.07E 00
MG-27	9.458 M	1.71E 00	1.02E 00	1.04E 00	1.48E 00	1.18E 00	1.41E 00	9.13E-01	1.19E 00
MG-28	20.91 H	2.56E 00	1.53E 00	1.55E 00	2.22E 00	1.76E 00	2.10E 00	1.40E 00	1.79E 00
AL-26	7.2E5 Y	5.20E 00	3.18E 00	3.22E 00	4.56E 00	3.57E 00	4.23E 00	2.95E 00	3.69E 00
AL-28	2.240 M	3.54E 00	2.19E 00	2.22E 00	3.11E 00	2.47E 00	2.89E 00	2.06E 00	2.53E 00
SI-31	157.3 M	1.66E-03	1.00E-03	1.02E-03	1.44E-03	1.16E-03	1.37E-03	9.19E-04	1.17E-03
SI-32	3.3E2 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-32	14.29 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-33	25.4 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S-35	87.44 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CL-36	3.01E5 Y	1.38E-07	1.86E-10	1.68E-10	5.98E-09	1.38E-13	4.12E-10	6.01E-14	8.24E-09
CL-38	37.21 M	3.04E 00	1.90E 00	1.93E 00	2.69E 00	2.12E 00	2.48E 00	1.79E 00	2.19E 00
AR-37	35.02 D	2.19E-05	2.96E-08	2.68E-08	9.53E-07	2.19E-11	6.57E-08	9.58E-12	1.31E-06
AR-39	269 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AR-41	1.827 H	2.40E 00	1.45E 00	1.47E 00	2.09E 00	1.67E 00	1.98E 00	1.33E 00	1.69E 00

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
K-40	1.277E9 Y	1.84E-01	1.85E-01	2.08E-01	2.30E-01	1.83E-01	1.70E-01	1.95E-01	1.93E-01
K-42	12.36 H	3.27E-01	3.31E-01	3.72E-01	4.12E-01	3.28E-01	3.04E-01	3.49E-01	3.22E-01
K-43	22.6 H	1.14E 00	1.08E 00	1.20E 00	1.44E 00	1.06E 00	9.54E-01	1.12E 00	1.04E 00
CA-41	1.03E5 Y	3.05E-07	5.50E-14	2.43E-08	2.39E-05	3.97E-08	5.12E-13	7.54E-13	1.25E-07
CA-45	162.7 D	2.37E-12	2.18E-16	2.54E-13	1.13E-10	3.86E-13	2.04E-14	3.10E-15	1.18E-12
CA-47	4.536 D	1.25E 00	1.25E 00	1.40E 00	1.56E 00	1.23E 00	1.13E 00	1.31E 00	1.21E 00
CA-49	8.719 M	4.28E 00	4.42E 00	4.86E 00	5.61E 00	4.43E 00	4.19E 00	4.70E 00	4.38E 00
SC-44	3.927 H	2.52E 00	2.45E 00	2.75E 00	3.14E 00	2.41E 00	2.19E 00	2.56E 00	2.36E 00
SC-46	83.80 D	2.43E 00	2.38E 00	2.68E 00	2.97E 00	2.35E 00	2.14E 00	2.50E 00	2.30E 00
SC-46M	18.72 S	1.02E-01	9.44E-02	1.01E-01	1.62E-01	9.31E-02	8.11E-02	9.94E-02	9.11E-02
SC-47	3.422 D	1.25E-01	1.15E-01	1.23E-01	1.92E-01	1.13E-01	9.92E-02	1.20E-01	1.11E-01
SC-48	43.67 H	4.03E 00	3.97E 00	4.47E 00	4.96E 00	3.92E 00	3.59E 00	4.18E 00	3.84E 00
SC-49	57.4 M	1.29E-03	1.32E-03	1.48E-03	1.64E-03	1.31E-03	1.22E-03	1.40E-03	1.29E-03
TI-44	47.3 Y	1.21E-01	1.29E-01	1.28E-01	2.57E-01	1.14E-01	1.02E-01	1.22E-01	1.09E-01
TI-45	3.08 H	1.01E 00	9.63E-01	1.07E 00	1.28E 00	9.41E-01	8.47E-01	9.99E-01	9.22E-01
TI-51	5.752 M	4.33E-01	4.04E-01	4.44E-01	5.66E-01	3.95E-01	3.55E-01	4.18E-01	3.90E-01
V-48	15.971 D	3.48E 00	3.42E 00	3.84E 00	4.31E 00	3.38E 00	3.09E 00	3.59E 00	3.31E 00
V-49	330 D	9.15E-07	1.65E-13	7.30E-08	7.17E-05	1.19E-07	1.54E-09	2.26E-09	3.76E-07
V-52	3.75 M	1.70E 00	1.71E 00	1.93E 00	2.13E 00	1.69E 00	1.57E 00	1.80E 00	1.66E 00
CR-49	42.09 M	1.21E 00	1.15E 00	1.27E 00	1.57E 00	1.12E 00	1.00E 00	1.19E 00	1.09E 00
CR-51	27.704 D	3.66E-02	3.38E-02	3.69E-02	4.87E-02	3.30E-02	2.96E-02	3.49E-02	3.27E-02
MN-52	5.591 D	4.13E 00	4.05E 00	4.56E 00	5.11E 00	4.00E 00	3.66E 00	4.26E 00	3.92E 00
MN-52M	21.4 M	2.82E 00	2.77E 00	3.11E 00	3.54E 00	2.73E 00	2.50E 00	2.91E 00	2.68E 00
MN-53	3.7E6 Y	1.70E-06	3.06E-13	1.35E-07	1.33E-04	2.21E-07	2.85E-09	4.19E-09	6.96E-07
MN-54	312.7 D	1.02E 00	9.82E-01	1.10E 00	1.24E 00	9.69E-01	8.77E-01	1.03E 00	9.48E-01

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
K-40	1.277E9 Y	1.95E-01	1.85E-01	1.95E-01	2.04E-01	1.97E-01	1.74E-01	1.63E-01	2.07E-01
K-42	12.36 H	3.49E-01	3.31E-01	3.49E-01	3.64E-01	3.52E-01	3.10E-01	2.87E-01	3.69E-01
K-43	22.6 H	1.12E 00	1.08E 00	1.15E 00	1.34E 00	1.18E 00	1.03E 00	9.28E-01	1.36E 00
CA-41	1.03E5 Y	3.65E-10	2.96E-09	2.41E-07	1.45E-07	7.91E-08	1.19E-07	1.78E-07	3.91E-07
CA-45	162.7 D	2.94E-14	8.11E-14	2.14E-12	1.85E-12	7.16E-13	1.10E-12	1.43E-12	3.49E-12
CA-47	4.536 D	1.31E 00	1.24E 00	1.32E 00	1.39E 00	1.33E 00	1.18E 00	1.08E 00	1.41E 00
CA-49	8.719 M	4.84E 00	4.45E 00	4.62E 00	4.73E 00	4.79E 00	3.91E 00	3.95E 00	4.80E 00
SC-44	3.927 H	2.56E 00	2.44E 00	2.60E 00	2.85E 00	2.64E 00	2.34E 00	2.10E 00	2.90E 00
SC-46	83.80 D	2.49E 00	2.36E 00	2.51E 00	2.68E 00	2.54E 00	2.28E 00	2.04E 00	2.73E 00
SC-46M	18.72 S	9.58E-02	9.43E-02	1.04E-01	1.58E-01	9.51E-02	8.16E-02	7.83E-02	1.62E-01
SC-47	3.422 D	1.17E-01	1.15E-01	1.26E-01	1.86E-01	1.19E-01	9.96E-02	9.63E-02	1.90E-01
SC-48	43.67 H	4.17E 00	3.95E 00	4.19E 00	4.45E 00	4.24E 00	3.79E 00	3.42E 00	4.53E 00
SC-49	57.4 M	1.40E-03	1.32E-03	1.39E-03	1.44E-03	1.41E-03	1.22E-03	1.15E-03	1.46E-03
TI-44	47.3 Y	1.33E-01	1.27E-01	1.40E-01	2.46E-01	8.55E-02	1.05E-01	8.64E-02	2.53E-01
TI-45	3.08 H	9.99E-01	9.57E-01	1.03E 00	1.18E 00	1.05E 00	9.20E-01	8.24E-01	1.20E 00
TI-51	5.752 M	4.18E-01	4.02E-01	4.33E-01	5.27E-01	4.45E-01	3.74E-01	3.47E-01	5.36E-01
V-48	15.971 D	3.59E 00	3.40E 00	3.62E 00	3.88E 00	3.66E 00	3.26E 00	2.94E 00	3.95E 00
V-49	330 D	1.10E-09	8.90E-09	7.24E-07	4.34E-07	2.37E-07	3.58E-07	5.35E-07	1.17E-06
V-52	3.75 M	1.80E 00	1.71E 00	1.80E 00	1.89E 00	1.82E 00	1.61E 00	1.48E 00	1.92E 00
CR-49	42.09 M	1.19E 00	1.14E 00	1.23E 00	1.46E 00	1.23E 00	1.08E 00	9.72E-01	1.49E 00
CR-51	27.704 D	3.49E-02	3.37E-02	3.64E-02	4.56E-02	3.76E-02	3.10E-02	2.91E-02	4.64E-02
MN-52	5.591 D	4.25E 00	4.04E 00	4.29E 00	4.60E 00	4.35E 00	3.87E 00	3.49E 00	4.68E 00
MN-52M	21.4 M	2.91E 00	2.77E 00	2.94E 00	3.20E 00	2.98E 00	2.63E 00	2.39E 00	3.25E 00
MN-53	3.7E6 Y	2.03E-09	1.65E-08	1.34E-06	8.05E-07	4.40E-07	6.64E-07	9.90E-07	2.18E-06
MN-54	312.7 D	1.03E 00	9.76E-01	1.04E 00	1.13E 00	1.06E 00	9.49E-01	8.42E-01	1.15E 00

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
K-40	1.277E9 Y	2.92E-01	1.78E-01	1.80E-01	2.55E-01	2.04E-01	2.41E-01	1.65E-01	2.07E-01
K-42	12.36 H	5.21E-01	3.19E-01	3.22E-01	4.56E-01	3.65E-01	4.28E-01	2.96E-01	3.69E-01
K-43	22.6 H	1.77E 00	1.05E 00	1.06E 00	1.55E 00	1.18E 00	1.45E 00	9.40E-01	1.24E 00
CA-41	1.03E5 Y	5.09E-05	6.88E-08	6.21E-08	2.21E-06	5.09E-11	1.52E-07	2.22E-11	3.05E-06
CA-45	162.7 D	2.12E-10	7.45E-13	7.33E-13	1.65E-11	7.48E-15	2.08E-12	2.79E-16	1.86E-11
CA-47	4.536 D	1.99E 00	1.20E 00	1.22E 00	1.73E 00	1.38E 00	1.64E 00	1.10E 00	1.40E 00
CA-49	8.719 M	6.61E 00	4.28E 00	4.44E 00	6.05E 00	4.76E 00	5.42E 00	3.98E 00	4.88E 00
SC-44	3.927 H	3.96E 00	2.37E 00	2.40E 00	3.45E 00	2.70E 00	3.25E 00	2.14E 00	2.77E 00
SC-46	83.80 D	3.83E 00	2.29E 00	2.33E 00	3.32E 00	2.65E 00	3.17E 00	2.07E 00	2.67E 00
SC-46M	18.72 S	1.55E-01	9.42E-02	9.33E-02	1.44E-01	1.11E-01	1.43E-01	8.29E-02	1.13E-01
SC-47	3.422 D	1.87E-01	1.15E-01	1.13E-01	1.76E-01	1.34E-01	1.71E-01	1.01E-01	1.36E-01
SC-48	43.67 H	6.37E 00	3.82E 00	3.88E 00	5.52E 00	4.43E 00	5.26E 00	3.47E 00	4.46E 00
SC-49	57.4 M	2.06E-03	1.27E-03	1.29E-03	1.81E-03	1.43E-03	1.68E-03	1.19E-03	1.47E-03
TI-44	47.3 Y	2.32E-01	1.17E-01	1.19E-01	2.15E-01	1.67E-01	2.13E-01	1.02E-01	1.60E-01
TI-45	3.08 H	1.58E 00	9.35E-01	9.45E-01	1.38E 00	1.04E 00	1.28E 00	8.36E-01	1.10E 00
TI-51	5.752 M	6.58E-01	3.95E-01	3.97E-01	5.83E-01	4.45E-01	5.49E-01	3.54E-01	4.64E-01
V-48	15.971 D	5.49E 00	3.30E 00	3.34E 00	4.78E 00	3.79E 00	4.52E 00	3.00E 00	3.85E 00
V-49	330 D	1.53E-04	2.06E-07	1.87E-07	6.64E-06	1.53E-10	4.58E-07	6.68E-11	9.15E-06
V-52	3.75 M	2.71E 00	1.65E 00	1.66E 00	2.36E 00	1.89E 00	2.23E 00	1.52E 00	1.91E 00
CR-49	42.09 M	1.88E 00	1.11E 00	1.12E 00	1.66E 00	1.26E 00	1.54E 00	9.93E-01	1.32E 00
CR-51	27.704 D	5.54E-02	3.33E-02	3.33E-02	4.92E-02	3.71E-02	4.62E-02	2.97E-02	3.91E-02
MN-52	5.591 D	6.51E 00	3.91E 00	3.97E 00	5.66E 00	4.49E 00	5.36E 00	3.56E 00	4.56E 00
MN-52M	21.4 M	4.49E 00	2.68E 00	2.71E 00	3.89E 00	3.04E 00	3.64E 00	2.45E 00	3.13E 00
MN-53	3.7E6 Y	2.83E-04	3.82E-07	3.46E-07	1.23E-05	2.83E-10	8.48E-07	1.24E-10	1.70E-05
MN-54	312.7 D	1.60E 00	9.46E-01	9.65E-01	1.38E 00	1.10E 00	1.31E 00	8.49E-01	1.11E 00

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
MN-56	2.5785 H	2.12E 00	2.12E 00	2.37E 00	2.65E 00	2.10E 00	1.93E 00	2.24E 00	2.06E 00
MN-57	1.47 M	8.43E-02	8.10E-02	8.99E-02	1.12E-01	7.98E-02	7.18E-02	8.50E-02	7.81E-02
FE-52	8.275 H	8.56E-01	8.06E-01	8.90E-01	1.12E 00	7.88E-01	7.06E-01	8.37E-01	7.74E-01
FE-55	2.7 Y	2.23E-06	4.02E-13	1.78E-07	1.75E-04	2.90E-07	3.75E-09	5.51E-09	9.15E-07
FE-59	44.63 D	1.42E 00	1.40E 00	1.58E 00	1.75E 00	1.39E 00	1.27E 00	1.48E 00	1.36E 00
CO-56	78.76 D	4.51E 00	4.51E 00	5.04E 00	5.68E 00	4.48E 00	4.14E 00	4.76E 00	4.40E 00
CO-57	270.9 D	1.34E-01	1.25E-01	1.34E-01	2.23E-01	1.23E-01	1.07E-01	1.32E-01	1.20E-01
CO-58	70.80 D	1.18E 00	1.13E 00	1.27E 00	1.44E 00	1.12E 00	1.01E 00	1.19E 00	1.09E 00
CO-58M	9.15 H	3.95E-06	8.15E-07	5.70E-07	2.56E-04	7.60E-07	3.50E-07	1.03E-06	1.89E-06
CO-60	5.271 Y	2.97E 00	2.95E 00	3.32E 00	3.67E 00	2.92E 00	2.69E 00	3.11E 00	2.86E 00
CO-60M	10.47 M	4.67E-03	4.79E-03	5.20E-03	7.11E-03	4.57E-03	4.22E-03	4.89E-03	4.48E-03
CO-61	1.650 H	8.63E-02	8.97E-02	9.30E-02	1.53E-01	8.22E-02	7.45E-02	8.79E-02	7.93E-02
NI-56	6.10 D	2.06E 00	1.98E 00	2.21E 00	2.61E 00	1.95E 00	1.76E 00	2.07E 00	1.91E 00
NI-57	36.08 H	2.29E 00	2.28E 00	2.56E 00	2.88E 00	2.26E 00	2.08E 00	2.40E 00	2.21E 00
NI-59	7.5E4 Y	3.75E-06	6.75E-13	2.99E-07	2.93E-04	4.88E-07	6.29E-09	9.26E-09	1.54E-06
NI-63	100.1 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NI-65	2.520 H	6.51E-01	6.50E-01	7.32E-01	8.12E-01	6.43E-01	5.94E-01	6.85E-01	6.31E-01
CU-61	3.408 H	9.62E-01	9.16E-01	1.02E 00	1.21E 00	8.96E-01	8.08E-01	9.52E-01	8.79E-01
CU-62	9.74 M	1.17E 00	1.11E 00	1.24E 00	1.48E 00	1.09E 00	9.80E-01	1.16E 00	1.07E 00
CU-64	12.701 H	2.20E-01	2.10E-01	2.34E-01	2.78E-01	2.05E-01	1.85E-01	2.18E-01	2.01E-01
CU-67	61.88 D	1.30E-01	1.20E-01	1.28E-01	2.00E-01	1.17E-01	1.03E-01	1.24E-01	1.15E-01
ZN-62	9.26 H	5.21E-01	4.97E-01	5.51E-01	6.66E-01	4.84E-01	4.36E-01	5.15E-01	4.75E-01
ZN-65	244.4 D	6.96E-01	6.85E-01	7.72E-01	8.56E-01	6.77E-01	6.20E-01	7.21E-01	6.63E-01
ZN-69	55.6 M	6.97E-06	6.54E-06	7.22E-06	8.97E-06	6.38E-06	5.73E-06	6.76E-06	6.28E-06
ZN-69M	13.76 H	4.84E-01	4.55E-01	5.04E-01	6.18E-01	4.44E-01	3.99E-01	4.71E-01	4.37E-01

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
MN-56	2.5785 H	2.24E 00	2.12E 00	2.24E 00	2.36E 00	2.27E 00	1.99E 00	1.84E 00	2.40E 00
MN-57	1.47 M	8.43E-02	8.07E-02	8.67E-02	1.04E-01	8.58E-02	7.57E-02	6.90E-02	1.06E-01
FE-52	8.275 H	8.32E-01	8.01E-01	8.64E-01	1.05E 00	8.72E-01	7.54E-01	6.87E-01	1.07E 00
FE-55	2.7 Y	2.67E-09	2.17E-08	1.76E-06	1.06E-06	5.79E-07	6.73E-07	1.30E-06	2.86E-06
FE-59	44.63 D	1.47E 00	1.40E 00	1.48E 00	1.57E 00	1.49E 00	1.33E 00	1.21E 00	1.59E 00
CO-56	78.76 D	4.79E 00	4.51E 00	4.76E 00	5.01E 00	4.84E 00	4.20E 00	3.93E 00	5.09E 00
CO-57	270.9 D	1.27E-01	1.25E-01	1.38E-01	2.17E-01	1.21E-01	1.08E-01	1.02E-01	2.24E-01
CO-58	70.80 D	1.18E 00	1.13E 00	1.20E 00	1.32E 00	1.22E 00	1.09E 00	9.71E-01	1.34E 00
CO-58M	9.15 H	1.58E-06	5.75E-07	3.48E-06	3.03E-06	1.16E-06	1.91E-06	2.33E-06	5.72E-06
CO-60	5.271 Y	3.10E 00	2.94E 00	3.11E 00	3.28E 00	3.14E 00	2.80E 00	2.55E 00	3.33E 00
CO-60M	10.47 M	5.07E-03	4.76E-03	5.08E-03	6.08E-03	4.65E-03	4.39E-03	3.90E-03	6.20E-03
CO-61	1.650 H	9.39E-02	8.88E-02	9.65E-02	1.43E-01	7.47E-02	7.84E-02	6.61E-02	1.46E-01
NI-56	6.10 D	2.06E 00	1.97E 00	2.11E 00	2.39E 00	2.13E 00	1.88E 00	1.70E 00	2.44E 00
NI-57	36.08 H	2.40E 00	2.28E 00	2.41E 00	2.58E 00	2.44E 00	2.14E 00	1.97E 00	2.62E 00
NI-59	7.5E4 Y	4.49E-09	3.64E-08	2.96E-06	1.76E-06	9.72E-07	1.47E-06	2.19E-06	4.81E-06
NI-63	100.1 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NI-65	2.520 H	6.84E-01	6.49E-01	6.87E-01	7.23E-01	6.93E-01	6.13E-01	5.63E-01	7.35E-01
CU-61	3.408 H	9.51E-01	9.11E-01	9.77E-01	1.12E 00	9.97E-01	8.73E-01	7.84E-01	1.14E 00
CU-62	9.74 M	1.16E 00	1.11E 00	1.19E 00	1.37E 00	1.22E 00	1.06E 00	9.53E-01	1.39E 00
CU-64	12.701 H	2.18E-01	2.09E-01	2.24E-01	2.57E-01	2.29E-01	2.00E-01	1.80E-01	2.61E-01
CU-67	61.88 D	1.23E-01	1.20E-01	1.31E-01	1.92E-01	1.23E-01	1.04E-01	9.97E-02	1.96E-01
ZN-62	9.26 H	5.18E-01	4.93E-01	5.29E-01	6.10E-01	5.38E-01	4.73E-01	4.23E-01	6.20E-01
ZN-65	244.4 D	7.19E-01	6.82E-01	7.24E-01	7.69E-01	7.32E-01	6.56E-01	5.90E-01	7.82E-01
ZN-69	55.6 M	6.76E-06	6.50E-06	7.00E-06	8.35E-06	7.21E-06	6.14E-06	5.61E-06	8.48E-06
ZN-69M	13.76 H	4.71E-01	4.52E-01	4.87E-01	5.74E-01	5.00E-01	4.29E-01	3.90E-01	5.84E-01

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
MN-56	2.5785 H	3.35E 00	2.04E 00	2.08E 00	2.93E 00	2.32E 00	2.74E 00	1.88E 00	2.37E 00
MN-57	1.47 M	1.33E-01	7.88E-02	7.96E-02	1.17E-01	9.08E-02	1.11E-01	7.08E-02	9.30E-02
FE-52	8.275 H	1.32E 00	7.86E-01	7.91E-01	1.17E 00	8.86E-01	1.09E 00	7.02E-01	9.27E-01
FE-55	2.7 Y	3.72E-04	5.03E-07	4.55E-07	1.62E-05	3.72E-10	1.12E-06	1.63E-10	2.23E-05
FE-59	44.63 D	2.24E 00	1.35E 00	1.37E 00	1.95E 00	1.56E 00	1.85E 00	1.23E 00	1.57E 00
CO-56	78.76 D	7.09E 00	4.35E 00	4.44E 00	6.24E 00	4.94E 00	5.82E 00	4.00E 00	5.05E 00
CO-57	270.9 D	2.09E-01	1.25E-01	1.24E-01	1.95E-01	1.51E-01	1.94E-01	1.09E-01	1.52E-01
CO-58	70.80 D	1.85E 00	1.09E 00	1.11E 00	1.60E 00	1.26E 00	1.51E 00	9.80E-01	1.28E 00
CO-58M	9.15 H	5.39E-04	1.27E-06	1.29E-06	2.68E-05	7.53E-07	3.61E-06	1.43E-07	3.43E-05
CO-60	5.271 Y	4.70E 00	2.84E 00	2.88E 00	4.09E 00	3.28E 00	3.88E 00	2.60E 00	3.31E 00
CO-60M	10.47 M	8.58E-03	4.51E-03	4.59E-03	7.03E-03	5.52E-03	6.66E-03	4.09E-03	5.56E-03
CO-61	1.650 H	1.58E-01	8.26E-02	8.47E-02	1.41E-01	1.10E-01	1.37E-01	7.31E-02	1.08E-01
NI-56	6.10 D	3.21E 00	1.92E 00	1.94E 00	2.81E 00	2.20E 00	2.66E 00	1.72E 00	2.25E 00
NI-57	36.08 H	3.62E 00	2.20E 00	2.23E 00	3.17E 00	2.50E 00	2.97E 00	2.03E 00	2.56E 00
NI-59	7.5E4 Y	6.26E-04	8.45E-07	7.64E-07	2.72E-05	6.26E-10	1.87E-06	2.73E-10	3.75E-05
NI-63	100.1 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NI-65	2.520 H	1.03E 00	6.27E-01	6.34E-01	9.01E-01	7.18E-01	8.51E-01	5.77E-01	7.28E-01
CU-61	3.408 H	1.50E 00	8.89E-01	8.98E-01	1.31E 00	9.99E-01	1.22E 00	7.96E-01	1.05E 00
CU-62	9.74 M	1.82E 00	1.08E 00	1.09E 00	1.60E 00	1.21E 00	1.48E 00	9.68E-01	1.27E 00
CU-64	12.701 H	3.43E-01	2.04E-01	2.06E-01	3.00E-01	2.28E-01	2.78E-01	1.82E-01	2.39E-01
CU-67	61.88 D	1.98E-01	1.19E-01	1.18E-01	1.82E-01	1.40E-01	1.78E-01	1.05E-01	1.43E-01
ZN-62	9.26 H	8.20E-01	4.81E-01	4.87E-01	7.14E-01	5.43E-01	6.64E-01	4.30E-01	5.69E-01
ZN-65	244.4 D	1.10E 00	6.60E-01	6.70E-01	9.54E-01	7.65E-01	9.10E-01	5.99E-01	7.70E-01
ZN-69	55.6 M	1.07E-05	6.38E-06	6.42E-06	9.43E-06	7.10E-06	8.75E-06	5.71E-06	7.50E-06
ZN-69M	13.76 H	7.45E-01	4.43E-01	4.46E-01	6.55E-01	4.93E-01	6.07E-01	3.97E-01	5.21E-01

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
GA-66	9.40 H	3.18E 00	3.19E 00	3.53E 00	4.06E 00	3.17E 00	2.94E 00	3.37E 00	3.12E 00
GA-67	3.261 D	1.63E-01	1.52E-01	1.63E-01	2.43E-01	1.48E-01	1.31E-01	1.57E-01	1.45E-01
GA-68	68.0 M	1.11E 00	1.05E 00	1.17E 00	1.39E 00	1.03E 00	9.27E-01	1.09E 00	1.01E 00
GA-72	14.1 H	3.42E 00	3.43E 00	3.84E 00	4.31E 00	3.41E 00	3.15E 00	3.63E 00	3.35E 00
GE-68	288 D	8.86E-06	2.01E-12	7.10E-07	6.87E-04	1.16E-06	1.55E-08	2.09E-08	3.65E-06
GE-71	11.8 D	8.97E-06	2.03E-12	7.19E-07	6.95E-04	1.17E-06	1.57E-08	2.12E-08	3.70E-06
GE-77	11.30 H	1.26E 00	1.21E 00	1.34E 00	1.63E 00	1.19E 00	1.07E 00	1.26E 00	1.17E 00
AS-72	26.0 H	2.13E 00	2.05E 00	2.30E 00	2.66E 00	2.02E 00	1.83E 00	2.15E 00	1.98E 00
AS-73	80.30 D	3.31E-03	3.92E-03	3.37E-03	1.09E-02	2.99E-03	2.83E-03	3.38E-03	2.96E-03
AS-74	17.77 D	9.01E-01	8.58E-01	9.59E-01	1.13E 00	8.41E-01	7.57E-01	8.93E-01	8.23E-01
AS-76	26.32 H	5.11E-01	4.95E-01	5.54E-01	6.37E-01	4.86E-01	4.41E-01	5.17E-01	4.77E-01
AS-77	38.8 H	1.00E-02	9.29E-03	1.01E-02	1.36E-02	9.06E-03	8.12E-03	9.60E-03	8.96E-03
SE-73	7.15 H	1.25E 00	1.19E 00	1.31E 00	1.64E 00	1.16E 00	1.04E 00	1.23E 00	1.14E 00
SE-75	119.78 D	4.46E-01	4.12E-01	4.45E-01	6.37E-01	4.02E-01	3.58E-01	4.27E-01	3.97E-01
SE-79	6.5E4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BR-77	57.04 H	3.69E-01	3.48E-01	3.85E-01	4.78E-01	3.40E-01	3.06E-01	3.61E-01	3.35E-01
BR-80	17.4 M	8.83E-02	8.43E-02	9.42E-02	1.10E-01	8.26E-02	7.44E-02	8.77E-02	8.09E-02
BR-80M	4.42 H	4.02E-03	5.96E-03	3.04E-03	1.98E-02	2.85E-03	3.22E-03	4.56E-03	3.43E-03
BR-82	35.30 H	3.16E 00	3.07E 00	3.45E 00	3.91E 00	3.03E 00	2.75E 00	3.22E 00	2.97E 00
BR-83	2.39 H	8.71E-03	8.28E-03	9.23E-03	1.09E-02	8.09E-03	7.28E-03	8.59E-03	7.93E-03
BR-84	31.80 M	2.30E 00	2.33E 00	2.59E 00	2.94E 00	2.32E 00	2.16E 00	2.47E 00	2.29E 00
BR-85	172 S	8.07E-02	7.87E-02	8.85E-02	9.91E-02	7.78E-02	7.07E-02	8.28E-02	7.61E-02
KR-79	35.04 H	2.95E-01	2.79E-01	3.09E-01	3.80E-01	2.73E-01	2.45E-01	2.89E-01	2.68E-01
KR-81	2.1E5 Y	1.16E-02	1.06E-02	1.15E-02	1.72E-02	1.04E-02	9.28E-03	1.09E-02	1.03E-02
KR-83M	1.83 H	1.61E-05	4.22E-06	3.34E-06	6.24E-04	4.04E-06	2.25E-06	3.35E-06	9.08E-06

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
GA-66	9.40 H	3.42E 00	3.19E 00	3.36E 00	3.55E 00	3.45E 00	2.92E 00	2.80E 00	3.60E 00
GA-67	3.261 D	1.56E-01	1.51E-01	1.65E-01	2.31E-01	1.57E-01	1.35E-01	1.26E-01	2.36E-01
GA-68	68.0 M	1.09E 00	1.05E 00	1.12E 00	1.29E 00	1.15E 00	1.01E 00	9.02E-01	1.31E 00
GA-72	14.1 H	3.65E 00	3.44E 00	3.63E 00	3.81E 00	3.69E 00	3.20E 00	2.99E 00	3.88E 00
GE-68	288 D	1.12E-08	8.88E-08	7.03E-06	4.26E-06	2.31E-06	3.48E-06	5.18F-06	1.14E-05
GE-71	11.8 D	1.14E-08	8.98F-08	7.11E-06	4.31E-06	2.33E-06	3.52E-06	5.24E-06	1.15E-05
GE-77	11.30 H	1.26E 00	1.20E 00	1.29E 00	1.49E 00	1.31E 00	1.13E 00	1.04F 00	1.52E 00
AS-72	26.0 H	2.14E 00	2.04E 00	2.18E 00	2.43E 00	2.23E 00	1.96E 00	1.76E 00	2.47E 00
AS-73	80.30 D	4.37E-03	3.75E-03	4.20E-03	7.57E-03	2.10E-03	3.05E-03	2.26E-03	7.78F-03
AS-74	17.77 D	8.92E-01	8.53E-01	9.15E-01	1.04E 00	9.35E-01	8.23E-01	7.35E-01	1.05E 00
AS-76	26.32 H	5.17E-01	4.92E-01	5.26E-01	5.81E-01	5.35E-01	4.72E-01	4.25E-01	5.91E-01
AS-77	38.8 H	9.59E-03	9.25E-03	1.00E-02	1.27E-02	1.01E-02	8.48E-03	7.93E-03	1.30E-02
SE-73	7.15 H	1.23E 00	1.18F 00	1.27E 00	1.52E 00	1.28E 00	1.12E 00	1.01E 00	1.55E 00
SE-75	119.78 D	4.23E-01	4.10E-01	4.46E-01	6.05E-01	4.41E-01	3.68E-01	3.49E-01	6.18E-01
SE-79	6.5E4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BR-77	57.04 H	3.60E-01	3.46E-01	3.72E-01	4.43E-01	3.80E-01	3.26E-01	2.98F-01	4.51E-01
BR-80	17.4 M	8.76E-02	8.37F-02	8.97E-02	1.01E-01	9.16E-02	8.09E-02	7.21F-02	1.03E-01
BR-80M	4.42 H	8.16E-03	4.65E-03	5.32E-03	9.32E-03	2.14E-03	3.86E-03	2.56E-03	9.55E-03
BR-82	35.30 H	3.22E 00	3.06E 00	3.26E 00	3.55E 00	3.31E 00	2.95E 00	2.64E 00	3.61E 00
BR-83	2.39 H	8.59E-03	8.23E-03	8.83E-03	1.01E-02	9.03E-03	7.92E-03	7.08E-03	1.03E-02
BR-84	31.8[illegible] M	2.50E 00	2.34E 00	2.45E 00	2.55E 00	2.51E 00	2.13E 00	2.05E 00	2.59E 00
BR-85	172 S	8.26E-02	7.83E-02	8.34E-02	8.96E-02	8.46E-02	7.55E-02	6.77E-02	9.11E-02
KR-79	35.04 H	2.89E-01	2.77E-01	2.98E-01	3.51E-01	3.04E-01	2.62E-01	2.39E-01	3.57E-01
KR-81	2.1E5 Y	1.09E-02	1.06E-02	1.15E-02	1.48E-02	1.18E-02	9.58E-03	9.15E-03	1.51E-02
KR-83M	1.83 H	6.85E-06	3.70E-06	1.59E-05	1.74E-05	5.48E-06	9.07E-06	9.77E-06	2.64E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
GA-66	9.40 H	4.94E 00	3.08E 00	3.16E 00	4.42E 00	3.46E 00	4.05E 00	2.83E 00	3.56E 00
GA-67	3.261 D	2.53E-01	1.49E-01	1.49E-01	2.29E-01	1.74E-01	2.20E-01	1.32E-01	1.79E-01
GA-68	68.0 M	1.72E 00	1.02E 00	1.03E 00	1.51E 00	1.14E 00	1.40E 00	9.15E-01	1.20E 00
GA-72	14.1 H	5.40E 00	3.31E 00	3.38E 00	4.74E 00	3.75E 00	4.42E 00	3.06E 00	3.84E 00
GE-68	288 D	1.46E-03	2.01E-06	1.82E-06	6.42E-05	1.61E-09	4.49E-06	6.39E-10	8.82E-05
GE-71	11.8 D	1.48E-03	2.04E-06	1.84E-06	6.50E-05	1.63E-09	4.54E-06	6.46E-10	8.92E-05
GE-77	11.30 H	1.95E 00	1.17E 00	1.18E 00	1.72E 00	1.33E 00	1.62E 00	1.06E 00	1.38E 00
AS-72	26.0 H	3.34E 00	1.99E 00	2.02E 00	2.91E 00	2.25E 00	2.72E 00	1.79E 00	2.33E 00
AS-73	80.30 D	1.24E-02	3.22E-03	3.39E-03	7.44E-03	5.24E-03	6.84E-03	2.67E-03	5.45E-03
AS-74	17.77 D	1.41E 00	8.32E-01	8.43E-01	1.22E 00	9.36E-01	1.14E 00	7.44E-01	9.78E-01
AS-76	26.32 H	8.01E-01	4.78E-01	4.85E-01	6.98E-01	5.42E-01	6.53E-01	4.32E-01	5.60E-01
AS-77	38.8 H	1.52E-02	9.12E-03	9.13E-03	1.36E-02	1.03E-02	1.28E-02	8.13E-03	1.08E-02
SE-73	7.15 H	1.96E 00	1.15E 00	1.16E 00	1.72E 00	1.30E 00	1.60E 00	1.03E 00	1.37E 00
SE-75	119.78 D	6.76E-01	4.07E-01	4.05E-01	6.11E-01	4.65E-01	5.85E-01	3.61E-01	4.82E-01
SE-79	6.5E4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BR-77	57.04 H	5.71E-01	3.39E-01	3.42E-01	5.01E-01	3.82E-01	4.70E-01	3.03E-01	3.99E-01
BR-80	17.4 M	1.38E-01	8.16E-02	8.27E-02	1.20E-01	9.22E-02	1.12E-01	7.30E-02	9.59E-02
BR-80M	4.42 H	2.24E-02	3.65E-03	4.04E-03	1.30E-02	7.47E-03	1.02E-02	2.77E-03	8.79E-03
BR-82	35.30 H	4.97E 00	2.97E 00	3.01E 00	4.32E 00	3.40E 00	4.08E 00	2.68E 00	3.47E 00
BR-83	2.39 H	1.36E-02	8.03E-03	8.12E-03	1.18E-02	8.99E-03	1.10E-02	7.18E-03	9.44E-03
BR-84	31.80 M	3.60E 00	2.25E 00	2.31E 00	3.21E 00	2.54E 00	2.96E 00	2.08E 00	2.59E 00
BR-85	172 S	1.27E-01	7.58E-02	7.73E-02	1.10E-01	8.75E-02	1.05E-01	6.85E-02	8.87E-02
KR-79	35.04 H	4.58E-01	2.71E-01	2.74E-01	4.00E-01	3.05E-01	3.75E-01	2.43E-01	3.19E-01
KR-81	2.1E5 Y	2.01E-02	1.05E-02	1.05E-02	1.57E-02	1.18E-02	1.47E-02	9.35E-03	1.25E-02
KR-83M	1.83 H	1.16E-03	6.81E-06	7.12E-06	1.02E-04	5.14E-06	2.02E-05	1.54E-06	1.08E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
KR-85	10.72 Y	2.60E-03	2.47E-03	2.75E-03	3.27E-03	2.41E-03	2.17E-03	2.56E-03	2.36E-03
KR-85M	4.48 H	1.82E-01	1.67E-01	1.80E-01	2.71E-01	1.64E-01	1.44E-01	1.74E-01	1.61E-01
KR-87	76.3 M	1.01E 00	1.01E 00	1.12E 00	1.29E 00	1.00E 00	9.29E-01	1.07E 00	9.88E-01
KR-88	2.84 H	2.53E 00	2.59E 00	2.88E 00	3.26E 00	2.58E 00	2.40E 00	2.74E 00	2.54E 00
KR-89	3.16 M	2.30E 00	2.31E 00	2.57E 00	2.93E 00	2.29E 00	2.12E 00	2.44E 00	2.25E 00
KR-90	32.32 S	1.53E 00	1.52E 00	1.70E 00	1.94E 00	1.50E 00	1.38E 00	1.60E 00	1.47E 00
RB-81	4.58 H	7.05E-01	6.64E-01	7.33E-01	9.21E-01	6.49E-01	5.82E-01	6.88E-01	6.38E-01
RB-82	1.25 M	1.28E 00	1.22E 00	1.36E 00	1.61E 00	1.19E 00	1.07E 00	1.26E 00	1.17E 00
RB-83	86.2 D	5.83E-01	5.54E-01	6.18E-01	7.33E-01	5.42E-01	4.87E-01	5.75E-01	5.31E-01
RB-84	32.9 D	1.08E 00	1.04E 00	1.17E 00	1.33E 00	1.02E 00	9.27E-01	1.09E 00	1.00E 00
RB-86	18.66 D	1.14E-01	1.12E-01	1.26E-01	1.40E-01	1.11E-01	1.01E-01	1.18E-01	1.08E-01
RB-87	4.73E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RB-88	17.8 M	8.06E-01	8.19E-01	9.16E-01	1.02E 00	8.15E-01	7.56E-01	8.67E-01	8.00E-01
RB-89	15.44 M	2.58E 00	2.59E 00	2.90E 00	3.24E 00	2.57E 00	2.38E 00	2.74E 00	2.53E 00
RB-90	157 S	2.89E 00	2.93E 00	3.21E 00	3.73E 00	2.92E 00	2.76E 00	3.10E 00	2.90E 00
RB-90M	258 S	4.20E 00	4.24E 00	4.71E 00	5.35E 00	4.22E 00	3.93E 00	4.49E 00	4.16E 00
SR-82	25.0 D	5.91E-05	1.06E-07	7.58E-06	2.23E-03	1.10E-05	1.17E-06	2.24E-07	3.19E-05
SR-85	64.84 D	5.95E-01	5.65E-01	6.30E-01	7.52E-01	5.52E-01	4.97E-01	5.85E-01	5.41E-01
SR-85M	67.66 M	2.50E-01	2.28E-01	2.45E-01	3.55E-01	2.23E-01	1.99E-01	2.36E-01	2.22E-01
SR-87M	2.805 H	3.71E-01	3.47E-01	3.82E-01	4.81E-01	3.38E-01	3.04E-01	3.58E-01	3.34E-01
SR-89	50.55 D	1.67E-04	1.52E-04	1.82E-04	2.03E-04	1.60E-04	1.45E-04	1.70E-04	1.56E-04
SR-90	28.6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SR-91	9.5 H	8.32E-01	8.08E-01	9.08E-01	1.02E 00	7.97E-01	7.24E-01	8.48E-01	7.80E-01
SR-92	2.71 H	1.58E 00	1.58E 00	1.78E 00	1.97E 00	1.56E 00	1.44E 00	1.66E 00	1.53E 00
SR-93	7.3 M	2.73E 00	2.68E 00	3.01E 00	3.42E 00	2.66E 00	2.43E 00	2.82E 00	2.60E 00

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
KR-85	10.72 Y	2.56E-03	2.45E-03	2.63E-03	3.03E-03	2.70E-03	2.36E-03	2.11E-03	3.08E-03
KR-85M	4.48 H	1.70E-01	1.66E-01	1.82E-01	2.61E-01	1.75E-01	1.46E-01	1.40E-01	2.67E-01
KR-87	76.3 M	1.08E 00	1.01E 00	1.07E 00	1.14E 00	1.09E 00	9.25E-01	8.83E-01	1.16E 00
KR-88	2.84 H	2.77E 00	2.60E 00	2.73E 00	2.84E 00	2.77E 00	2.36E 00	2.27E 00	2.89E 00
KR-89	3.16 M	2.46E 00	2.31E 00	2.43E 00	2.58E 00	2.48E 00	2.13E 00	2.02E 00	2.62E 00
KR-90	32.32 S	1.59E 00	1.51E 00	1.61E 00	1.74E 00	1.62E 00	1.42E 00	1.31E 00	1.77E 00
RB-81	4.58 H	6.87E-01	6.60E-01	7.11E-01	8.56E-01	7.22E-01	6.22E-01	5.67E-01	8.72E-01
RB-82	1.25 M	1.26E 00	1.21E 00	1.30E 00	1.49E 00	1.33E 00	1.16E 00	1.04E 00	1.51E 00
RB-83	86.2 D	5.75E-01	5.50E-01	5.91E-01	6.76E-01	6.04E-01	5.30E-01	4.74E-01	6.87E-01
RB-84	32.9 D	1.09E 00	1.03E 00	1.10E 00	1.21E 00	1.12E 00	9.99E-01	8.92E-01	1.23E 00
RB-86	18.66 D	1.18E-01	1.11E-01	1.18E-01	1.26E-01	1.20E-01	1.07E-01	9.64E-02	1.28E-01
RB-87	4.73E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RB-88	17.8 M	8.72E-01	8.21E-01	8.64E-01	8.96E-01	8.76E-01	7.56E-01	7.14E-01	9.11E-01
RB-89	15.44 M	2.75E 00	2.59E 00	2.73E 00	2.86E 00	2.77E 00	2.42E 00	2.25E 00	2.91E 00
RB-90	157 S	3.21E 00	2.94E 00	3.05E 00	3.17E 00	3.19E 00	2.63E 00	2.62E 00	3.22E 00
RB-90M	258 S	4.55E 00	4.25E 00	4.46E 00	4.65E 00	4.57E 00	3.89E 00	3.72E 00	4.73E 00
SR-82	25.0 D	2.54E-06	3.72E-06	5.66E-05	5.63E-05	1.90E-05	3.03E-05	3.60E-05	9.25E-05
SR-85	64.84 D	5.86E-01	5.62E-01	6.03E-01	6.93E-01	6.17E-01	5.40E-01	4.83E-01	7.04E-01
SR-85M	67.66 M	2.35E-01	2.28E-01	2.47E-01	3.36E-01	2.49E-01	2.02E-01	1.95E-01	3.43E-01
SR-87M	2.805 H	3.59E-01	3.45E-01	3.72E-01	4.48E-01	3.83E-01	3.24E-01	2.99E-01	4.56E-01
SR-89	50.55 D	1.69E-04	1.61E-04	1.71E-04	1.84E-04	1.74E-04	1.56E-04	1.39E-04	1.88E-04
SR-90	28.6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SR-91	9.5 H	8.46E-01	8.03E-01	8.56E-01	9.25E-01	8.68E-01	7.77E-01	6.94E-01	9.41E-01
SR-92	2.71 H	1.66E 00	1.57E 00	1.66E 00	1.75E 00	1.68E 00	1.49E 00	1.36E 00	1.78E 00
SR-93	7.3 M	2.83E 00	2.68E 00	2.84E 00	3.07E 00	2.89E 00	2.53E 00	2.32E 00	3.12E 00

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
NB-96	23.35 H	4.66E 00	2.77E 00	2.82E 00	4.04E 00	3.18E 00	3.83E 00	2.55E 00	3.25E 00
NB-97	72.1 M	1.24E 00	7.36E-01	7.48E-01	1.08E 00	8.39E-01	1.01E 00	6.58E-01	8.65E-01
NB-97M	60 S	1.30E 00	8.16E-01	8.32E-01	1.19E 00	9.38E-01	1.13E 00	7.31E-01	9.58E-01
MO-91	15.49 M	1.77E 00	1.05E 00	1.06E 00	1.55E 00	1.18E 00	1.44E 00	9.43E-01	1.24E 00
MO-93	3.5E3 Y	6.48E-03	9.08E-05	9.93E-05	1.19E-03	1.98E-05	3.23E-04	1.03E-06	9.88E-04
MO-99	66.02 H	2.89E-01	1.71E-01	1.74E-01	2.52E-01	1.97E-01	2.39E-01	1.53E-01	2.02E-01
MO-101	14.61 M	2.86E 00	1.73E 00	1.76E 00	2.50E 00	1.97E 00	2.35E 00	1.58E 00	2.02E 00
TC-95	20.0 H	1.50E 00	8.83E-01	9.00E-01	1.29E 00	1.02E 00	1.22E 00	7.92E-01	1.04E 00
TC-95M	61 D	1.24E 00	7.33E-01	7.42E-01	1.08E 00	8.40E-01	1.02E 00	6.56E-01	8.62E-01
TC-96	4.28 D	4.76E 00	2.82E 00	2.88E 00	4.12E 00	3.26E 00	3.91E 00	2.53E 00	3.31E 00
TC-96M	51.5 M	8.24E-02	4.66E-02	4.74E-02	6.87E-02	5.37E-02	6.45E-02	4.20E-02	5.52E-02
TC-97	2.6E6 Y	7.46E-03	1.30E-04	1.44E-04	1.56E-03	4.06E-05	4.71E-04	2.75E-06	1.24E-03
TC-97M	89 D	6.70E-03	4.34E-04	4.51E-04	1.96E-03	4.44E-04	9.88E-04	2.68E-04	1.50E-03
TC-98	4.2E6 Y	2.63E 00	1.55E 00	1.58E 00	2.28E 00	1.78E 00	2.15E 00	1.39E 00	1.82E 00
TC-99	2.13E5 Y	8.85E-07	4.89E-07	4.92E-07	8.30E-07	6.45E-07	8.29E-07	4.27E-07	6.32E-07
TC-99M	6.02 H	2.18E-01	1.32E-01	1.31E-01	2.03E-01	1.56E-01	2.30E-01	1.16E-01	1.58E-01
TC-101	14.2 M	6.06E-01	3.64E-01	3.65E-01	5.38E-01	4.08E-01	5.06E-01	3.25E-01	4.28E-01
RU-97	2.9 D	4.03E-01	2.39E-01	2.38E-01	3.59E-01	2.71E-01	3.42E-01	2.13E-01	2.83E-01
RU-103	39.35 D	8.75E-01	5.19E-01	5.24E-01	7.65E-01	5.79E-01	7.08E-01	4.64E-01	6.10E-01
RU-105	4.44 H	1.46E 00	8.66E-01	8.78E-01	1.27E 00	9.86E-01	1.20E 00	7.75E-01	1.02E 00
RU-106	368.2 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RH-103M	56.119 M	1.20E-03	4.49E-05	5.07E-05	3.69E-04	4.32E-05	1.59E-04	1.00E-05	2.64E-04
RH-105	35.36 H	1.36E-01	8.20E-02	8.20E-02	1.21E-01	9.15E-02	1.14E-01	7.33E-02	9.42E-02
RH-105M	45 S	5.20E-02	2.78E-02	2.76E-02	4.47E-02	3.35E-02	4.31E-02	2.42E-02	3.47E-02
RH-106	29.92 S	3.82E-01	2.27E-01	2.30E-01	3.33E-01	2.56E-01	3.11E-01	2.03E-01	2.66E-01

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
NB-96	23.35 H	3.00E 00	2.86E 00	3.05E 00	3.33E 00	3.09E 00	2.76E 00	2.46E 00	3.38E 00
NB-97	72.1 M	7.93E-01	7.57E-01	8.10E-01	9.00E-01	8.25E-01	7.34E-01	6.52E-01	9.15E-01
NB-97M	60 S	8.83E-01	8.41E-01	8.98E-01	9.86E-01	9.14E-01	8.17E-01	7.25E-01	1.00E 00
MO-91	15.49 M	1.13E 00	1.08E 00	1.16E 00	1.33E 00	1.18E 00	1.03E 00	9.28E-01	1.35E 00
MO-93	3.5E3 Y	6.17E-05	3.53E-05	2.01E-04	2.50E-04	6.78E-05	1.19E-04	1.15E-04	3.30E-04
MO-99	66.02 H	1.85E-01	1.76E-01	1.89E-01	2.15E-01	1.91E-01	1.69E-01	1.51E-01	2.18E-01
MO-101	14.61 M	1.89E 00	1.79E 00	1.90E 00	2.02E 00	1.92E 00	1.69E 00	1.55E 00	2.08E 00
TC-95	20.0 H	9.57E-01	9.10E-01	9.72E-01	1.06E 00	9.88E-01	8.85E-01	7.85E-01	1.08E 00
TC-95M	61 D	7.87E-01	7.51E-01	8.05E-01	9.27E-01	8.16E-01	7.16E-01	6.47E-01	9.44E-01
TC-96	4.28 D	3.06E 00	2.91E 00	3.10E 00	3.37E 00	3.15E 00	2.82E 00	2.51E 00	3.43E 00
TC-96M	51.5 M	5.07E-02	4.81E-02	5.13E-02	5.54E-02	5.19E-02	4.65E-02	4.16E-02	5.64E-02
TC-97	2.6E6 Y	1.25E-04	5.99E-05	2.74E-04	3.59E-04	9.34E-05	1.66E-04	1.54E-04	4.54E-04
TC-97M	89 D	4.88E-04	3.82E-04	6.16E-04	9.42E-04	3.59E-04	4.33E-04	3.96E-04	1.04E-03
TC-98	4.2E6 Y	1.68E 00	1.60E 00	1.71E 00	1.89E 00	1.74E 00	1.55E 00	1.38E 00	1.92E 00
TC-99	2.13E5 Y	5.22E-07	5.10E-07	5.65E-07	9.58E-07	4.14E-07	4.29E-07	3.78E-07	9.86E-07
TC-99M	6.02 H	1.34E-01	1.32E-01	1.45E-01	2.22E-01	1.33E-01	1.14E-01	1.09E-01	2.28E-01
TC-101	14.2 M	3.83E-01	3.69E-01	3.98E-01	4.95E-01	4.09E-01	3.41E-01	3.19E-01	5.04E-01
RU-97	2.9 D	2.49E-01	2.41E-01	2.62E-01	3.50E-01	2.64E-01	2.15E-01	2.07E-01	3.58E-01
RU-103	39.35 D	5.54E-01	5.31E-01	5.70E-01	6.58E-01	5.83E-01	5.09E-01	4.57E-01	6.68E-01
RU-105	4.44 H	9.31E-01	8.88E-01	9.52E-01	1.07E 00	9.70E-01	8.56E-01	7.66E-01	1.09E 00
RU-106	368.2 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RH-103M	56.119 M	9.00E-05	3.62E-05	8.23E-05	1.23E-04	2.90E-05	5.43E-05	4.26E-05	1.39E-04
RH-105	35.36 H	8.61E-02	8.30E-02	8.96E-02	1.13E-01	9.26E-02	7.62E-02	7.17E-02	1.15E-01
RH-105M	45 S	2.85E-02	2.78E-02	3.10E-02	4.82E-02	2.72E-02	2.41E-02	2.29E-02	4.96E-02
RH-106	29.92 S	2.44E-01	2.33E-01	2.49E-01	2.80E-01	2.54E-01	2.24E-01	2.01E-01	2.85E-01

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
NB-96	23.35 H	2.97E 00	2.87E 00	3.22E 00	3.66E 00	2.83E 00	2.57E 00	3.01E 00	2.77E 00
NB-97	72.1 M	7.95E-01	7.61E-01	8.53E-01	9.81E-01	7.48E-01	6.75E-01	7.95E-01	7.32E-01
NB-97M	60 S	8.80E-01	8.46E-01	9.50E-01	1.08E 00	8.33E-01	7.52E-01	8.86E-01	8.15E-01
MO-91	15.49 M	1.14E 00	1.08E 00	1.21E 00	1.44E 00	1.06E 00	9.55E-01	1.13E 00	1.04E 00
MO-93	3.5E3 Y	1.87E-04	1.14E-05	3.63E-05	4.19E-03	4.78E-05	1.61E-05	1.51E-05	1.18E-04
MO-99	66.02 H	1.85E-01	1.77E-01	1.98E-01	2.33E-01	1.74E-01	1.57E-01	1.85E-01	1.71E-01
MO-101	14.61 M	1.81E 00	1.79E 00	2.01E 00	2.28E 00	1.77E 00	1.62E 00	1.89E 00	1.74E 00
TC-95	20.0 H	9.51E-01	9.16E-01	1.03E 00	1.17E 00	9.02E-01	8.16E-01	9.60E-01	8.83E-01
TC-95M	61 D	7.93E-01	7.55E-01	8.40E-01	1.01E 00	7.42E-01	6.69E-01	7.89E-01	7.28E-01
TC-96	4.28 D	3.03E 00	2.93E 00	3.29E 00	3.71E 00	2.89E 00	2.61E 00	3.07E 00	2.82E 00
TC-96M	51.5 M	4.97E-02	4.83E-02	5.43E-02	6.39E-02	4.77E-02	4.34E-02	5.07E-02	4.67E-02
TC-97	2.6E6 Y	2.51E-04	2.91E-05	5.41E-05	4.97E-03	6.94E-05	2.94E-05	4.34E-05	1.43E-04
TC-97M	89 D	5.61E-04	3.60E-04	3.83E-04	4.82E-03	3.71E-04	2.96E-04	3.98E-04	4.49E-04
TC-98	4.2E6 Y	1.68E 00	1.61E 00	1.80E 00	2.06E 00	1.58E 00	1.43E 00	1.68E 00	1.55E 00
TC-99	2.13E5 Y	5.14E-07	5.12E-07	5.30E-07	9.79E-07	4.83E-07	4.20E-07	5.19E-07	4.62E-07
TC-99M	6.02 H	1.43E-01	1.32E-01	1.42E-01	2.28E-01	1.30E-01	1.13E-01	1.39E-01	1.27E-01
TC-101	14.2 M	4.00E-01	3.71E-01	4.06E-01	5.30E-01	3.62E-01	3.25E-01	3.83E-01	3.58E-01
RU-97	2.9 D	2.64E-01	2.42E-01	2.60E-01	3.77E-01	2.36E-01	2.11E-01	2.50E-01	2.35E-01
RU-103	39.35 D	5.63E-01	5.34E-01	5.95E-01	7.11E-01	5.22E-01	4.69E-01	5.54E-01	5.12E-01
RU-105	4.44 H	9.36E-01	8.94E-01	9.99E-01	1.17E 00	8.78E-01	7.92E-01	9.33E-01	8.60E-01
RU-106	368.2 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RH-103M	56.119 M	6.91E-05	4.02E-05	2.48E-05	8.82E-04	2.76E-05	2.23E-05	5.51E-05	5.02E-05
RH-105	35.36 H	9.04E-02	8.34E-02	9.10E-02	1.20E-01	8.13E-02	7.30E-02	8.60E-02	8.06E-02
RH-105M	45 S	3.02E-02	2.79E-02	2.97E-02	5.31E-02	2.74E-02	2.37E-02	2.95E-02	2.68E-02
RH-106	29.92 S	2.44E-01	2.34E-01	2.62E-01	3.05E-01	2.30E-01	2.07E-01	2.44E-01	2.25E-01

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/CUBIC CM

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
Y-86	14.74 H	6.89E 00	4.16E 00	4.22E 00	6.01E 00	4.74E 00	5.65E 00	3.80E 03	4.85E 00
Y-87	80.3 H	8.28E-01	4.89E-01	4.93E-01	7.22E-01	5.45E-01	6.67E-01	4.37E-01	5.75E-01
Y-88	106.60 D	5.33E 00	3.26E 00	3.32E 00	4.66E 00	3.70E 00	4.36E 00	3.03E 00	3.79E 00
Y-90	64.1 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Y-90M	3.19 H	1.13E 00	6.73E-01	6.76E-01	9.99E-01	7.57E-01	9.36E-01	6.01E-01	7.93E-01
Y-91	58.51 D	6.80E-03	4.10E-03	4.15E-03	5.91E-03	4.73E-03	5.62E-03	3.74E-03	4.77E-03
Y-91M	49.71 M	9.71E-01	5.75E-01	5.82E-01	8.47E-01	6.46E-01	7.88E-01	5.14E-01	6.76E-01
Y-92	3.54 H	4.78E-01	2.86E-01	2.91E-01	4.15E-01	3.30E-01	3.94E-01	2.60E-01	3.35E-01
Y-93	10.1 H	1.72E-01	1.05E-01	1.06E-01	1.51E-01	1.19E-01	1.42E-01	9.65E-02	1.22E-01
ZR-86	16.5 H	4.89E-01	2.87E-01	2.86E-01	4.30E-01	3.25E-01	4.07E-01	2.55E-01	3.40E-01
ZR-88	83.4 D	6.84E-01	4.06E-01	4.08E-01	6.00E-01	4.52E-01	5.58E-01	3.63E-01	4.78E-01
ZR-89	78.43 H	2.20E 00	1.30E 00	1.33E 00	1.90E 00	1.50E 00	1.80E 00	1.17E 00	1.53E 00
ZR-93	1.53E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZR-95	64.02 D	1.39E 00	8.24E-01	8.29E-01	1.21E 00	9.47E-01	1.14E 00	7.37E-01	9.47E-01
ZR-97	16.90 H	3.40E-01	2.04E-01	2.07E-01	2.96E-01	2.33E-01	2.79E-01	1.85E-01	2.39E-01
NB-90	14.60 H	8.32E 00	5.14E 00	5.24E 00	7.35E 00	5.79E 00	6.81E 00	4.78E 00	5.96E 00
NB-91	1E4 Y	8.97E-03	1.87E-03	1.89E-03	3.60E-03	2.02E-03	2.69E-03	1.61E-03	2.94E-03
NB-91M	61 D	8.56E-02	4.85E-02	4.91E-02	7.08E-02	5.40E-02	6.68E-02	4.41E-02	5.72E-02
NB-92	3.6E7 Y	2.83E 00	1.68E 00	1.71E 00	2.45E 00	1.93E 00	2.32E 00	1.50E 00	1.97E 00
NB-92M	10.15 D	1.85E 00	1.10E 00	1.12E 00	1.60E 00	1.28E 00	1.52E 00	9.86E-01	1.29E 00
NB-93M	14.6 Y	1.16E-03	1.62E-05	1.77E-05	2.12E-04	3.53E-06	5.76E-05	1.94E-07	1.77E-04
NB-94	2.03E4 Y	2.99E 00	1.77E 00	1.81E 00	2.59E 00	2.05E 00	2.46E 00	1.59E 00	2.08E 00
NB-94M	6.26 M	1.24E-02	4.76E-03	4.87E-03	7.57E-03	5.47E-03	6.76E-03	4.22E-03	6.19E-03
NB-95	35.06 D	1.45E 00	8.60E-01	8.76E-01	1.24E 00	9.90E-01	1.19E 00	7.72E-01	1.01E 00
NB-95M	86.6 H	1.07E-01	6.24E-02	6.20E-02	9.36E-02	7.06E-02	8.89E-02	5.55E-02	7.40E-02

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/CUBIC CM

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
Y-86	14.74 H	4.53E 00	4.30E 00	4.56E 00	4.90E 00	4.63E 00	4.07E 00	3.72E 00	4.98E 00
Y-87	80.3 H	5.21E-01	5.00E-01	5.37E-01	6.22E-01	5.50E-01	4.78E-01	4.30E-01	6.33E-01
Y-88	106.60 D	3.59E 00	3.39E 00	3.58E 00	3.73E 00	3.42E 00	3.16E 00	2.94E 00	3.80E 00
Y-90	64.1 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Y-90M	3.19 H	7.12E-01	6.85E-01	7.39E-01	9.09E-01	7.51E-01	6.39E-01	5.89E-01	9.25E-01
Y-91	58.51 D	4.47E-03	4.24E-03	4.49E-03	4.74E-03	4.53E-03	4.05E-03	3.67E-03	4.82E-03
Y-91M	49.71 M	6.14E-01	5.90E-01	6.32E-01	7.19E-01	6.46E-01	5.69E-01	5.08E-01	7.30E-01
Y-92	3.54 H	3.12E-01	2.96E-01	3.15E-01	3.37E-01	3.19E-01	2.84E-01	2.56E-01	3.43E-01
Y-93	10.1 H	1.14E-01	1.08E-01	1.15E-01	1.26E-01	1.17E-01	1.01E-01	9.39E-02	1.28E-01
ZR-86	16.5 H	3.01E-01	2.90E-01	3.14E-01	4.09E-01	3.19E-01	2.62E-01	2.49E-01	4.17E-01
ZR-88	83.4 D	4.29E-01	4.13E-01	4.47E-01	5.36E-01	4.59E-01	3.88E-01	3.57E-01	5.45E-01
ZR-89	78.43 H	1.41E 00	1.34E 00	1.43E 00	1.56E 00	1.45E 00	1.30E 00	1.16E 00	1.59E 00
ZR-93	1.53E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZR-95	64.02 D	8.91E-01	8.48E-01	9.07E-01	9.95E-01	9.22E-01	8.25E-01	7.31E-01	1.01E 00
ZR-97	16.90 H	2.22E-01	2.11E-01	2.24E-01	2.44E-01	2.28E-01	2.00E-01	1.82E-01	2.48E-01
NB-90	14.60 H	5.67E 00	5.34E 00	5.63E 00	5.95E 00	5.71E 00	4.90E 00	4.64E 00	6.05E 00
NB-91	1E4 Y	1.95E-03	1.86E-03	2.12E-03	2.46E-03	2.08E-03	1.86E-03	1.69E-03	2.56E-03
NB-91M	61 D	5.28E-02	5.01E-02	5.32E-02	5.86E-02	5.35E-02	4.79E-02	4.34E-02	5.74E-02
NB-92	3.6E7 Y	1.81E 00	1.73E 00	1.84E 00	2.02E 00	1.87E 00	1.67E 00	1.49E 00	2.05E 00
NB-92M	10.15 D	1.20E 00	1.13E 00	1.21E 00	1.30E 00	1.22E 00	1.10E 00	9.79E-01	1.32E 00
NB-93M	14.6 Y	1.10E-05	6.30E-06	3.58E-05	4.47E-05	1.21E-05	2.12E-05	2.09E-05	5.89E-05
NB-94	2.03E4 Y	1.92E 00	1.82E 00	1.95E 00	2.13E 00	1.98E 00	1.78E 00	1.58E 00	2.17E 00
NB-94M	6.26 M	5.16E-03	4.88E-03	5.31E-03	5.77E-03	5.29E-03	4.79E-03	4.26E-03	5.92E-03
NB-95	35.06 D	9.31E-01	8.85E-01	9.46E-01	1.03E 00	9.62E-01	8.61E-01	7.64E-01	1.05E 00
NB-95M	86.6 H	6.49E-02	6.27E-02	6.82E-02	9.13E-02	6.93E-02	5.59E-02	5.40E-02	9.32E-02

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/CUBIC CM

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
Y-86	14.74 H	4.37E 00	4.31E 00	4.83E 00	5.45E 00	4.26E 00	3.90E 00	4.53E 00	4.18E 00
Y-87	80.3 H	5.31E-01	5.03E-01	5.59E-01	6.75E-01	4.91E-01	4.42E-01	5.21E-01	4.82E-01
Y-88	106.60 D	3.36E 00	3.29E 00	3.80E 00	4.22E 00	3.37E 00	3.11E 00	3.58E 00	3.30E 00
Y-90	64.1 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Y-90M	3.19 H	7.34E-01	6.89E-01	7.56E-01	9.73E-01	6.72E-01	6.03E-01	7.13E-01	6.66E-01
Y-91	58.51 D	4.49E-03	4.25E-03	4.79E-03	5.29E-03	4.20E-03	3.86E-03	4.49E-03	4.12E-03
Y-91M	49.71 M	6.23E-01	5.93E-01	6.63E-01	7.79E-01	5.81E-01	5.23E-01	6.17E-01	5.69E-01
Y-92	3.54 H	3.03E-01	2.97E-01	3.34E-01	3.74E-01	2.94E-01	2.68E-01	3.12E-01	2.88E-01
Y-93	10.1 H	1.10E-01	1.08E-01	1.21E-01	1.40E-01	1.07E-01	9.98E-02	1.14E-01	1.06E-01
ZR-86	16.5 H	3.17E-01	2.91E-01	3.15E-01	4.44E-01	2.84E-01	2.54E-01	3.01E-01	2.82E-01
ZR-88	83.4 D	4.45E-01	4.15E-01	4.58E-01	5.78E-01	4.05E-01	3.64E-01	4.29E-01	4.00E-01
ZR-89	78.43 H	1.40E 00	1.35E 00	1.52E 00	1.72E 00	1.33E 00	1.21E 00	1.42E 00	1.33E 00
ZR-93	1.53E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZR-95	64.02 D	8.88E-01	8.54E-01	9.59E-01	1.09E 00	8.40E-01	7.59E-01	8.94E-01	8.22E-01
ZR-97	16.90 H	2.16E-01	2.11E-01	2.37E-01	2.70E-01	2.09E-01	1.91E-01	2.22E-01	2.05E-01
NB-90	14.60 H	5.27E 00	5.33E 00	5.94E 00	6.75E 00	5.30E 00	4.90E 00	5.64E 00	5.20E 00
NB-91	1E4 Y	2.10E-03	1.96E-03	2.09E-03	6.17E-03	1.85E-03	1.94E-03	1.93E-03	1.86E-03
NB-91M	61 D	5.09E-02	5.02E-02	5.66E-02	6.63E-02	4.97E-02	4.56E-02	5.29E-02	4.88E-02
NB-92	3.6E7 Y	1.80E 00	1.74E 00	1.95E 00	2.22E 00	1.71E 00	1.55E 00	1.82E 00	1.47E 00
NB-92M	10.15 D	1.17E 00	1.14E 00	1.28E 00	1.43E 00	1.13E 00	1.02E 00	1.20E 00	1.10E 00
NB-93M	14.6 Y	3.34E-05	2.04E-06	6.49E-06	7.49E-04	8.54E-06	2.87E-06	2.70E-05	2.10E-05
NB-94	2.03E4 Y	1.91E 00	1.84E 00	2.07E 00	2.33E 00	1.81E 00	1.54E 00	1.93E 00	1.77E 00
NB-94M	6.26 M	5.17E-03	4.89E-03	5.51E-03	9.02E-03	4.85E-03	4.38E-03	5.14E-03	4.79E-03
NB-95	35.06 D	9.26E-01	8.91E-01	1.00E 00	1.13E 00	8.78E-01	7.93E-01	9.34E-01	8.59E-01
NB-95M	86.6 H	6.91E-02	6.30E-02	6.77E-02	9.93E-02	4.14E-02	5.49E-02	6.50E-02	6.12E-02

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
KR-85	10.72 Y	4.04E-03	2.40E-03	2.42E-03	3.54E-03	2.68E-03	3.27E-03	2.14E-03	2.82E-03
KR-85M	4.48 H	2.73E-01	1.66E-01	1.65E-01	2.51E-01	1.92E-01	2.44E-01	1.47E-01	1.97E-01
KR-87	76.3 M	1.58E 00	9.77E-01	9.97E-01	1.40E 00	1.09E 00	1.29E 00	9.05E-01	1.13E 00
KR-88	2.84 H	4.00E 00	2.49E 00	2.55E 00	3.55E 00	2.80E 00	3.27E 00	2.34E 00	2.88E 00
KR-89	3.16 M	3.60E 00	2.23E 00	2.28E 00	3.19E 00	2.52E 00	2.96E 00	2.06E 00	2.58E 00
KR-90	32.32 S	2.42E 00	1.44E 00	1.48E 00	2.12E 00	1.67E 00	1.99E 00	1.34E 00	1.71E 00
RB-81	4.58 H	1.09E 00	6.47E-01	6.52E-01	9.59E-01	7.28E-01	8.97E-01	5.78E-01	7.63E-01
RB-82	1.25 M	1.99E 00	1.18E 00	1.19E 00	1.74E 00	1.32E 00	1.62E 00	1.05E 00	1.39E 00
RB-83	86.2 D	9.10E-01	5.37E-01	5.43E-01	7.92E-01	6.02E-01	7.35E-01	4.81E-01	6.32E-01
RB-84	32.9 D	1.69E 00	1.00E 00	1.02E 00	1.47E 00	1.15E 00	1.39E 00	9.02E-01	1.18E 00
RB-86	18.66 D	1.80E-01	1.08E-01	1.10E-01	1.54E-01	1.25E-01	1.49E-01	9.77E-02	1.26E-01
RB-87	4.73E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RB-88	17.8 M	1.28E 00	7.89E-01	8.04E-01	1.12E 00	8.91E-01	1.04E 00	7.36E-01	9.13E-01
RB-89	15.44 M	4.08E 00	2.50E 00	2.55E 00	3.58E 00	2.85E 00	3.33E 00	2.30E 00	2.90E 00
RB-90	157 S	4.40E 00	2.84E 00	2.95E 00	4.04E 00	3.20E 00	3.65E 00	2.60E 00	3.24E 00
RB-90M	258 S	6.55E 00	4.09E 00	4.21E 00	5.85E 00	4.63E 00	5.39E 00	3.77E 00	4.72E 00
SR-82	25.0 D	3.94E-03	2.16E-05	2.21E-05	4.02E-04	7.46E-07	6.62E-05	2.10E-08	4.11E-04
SR-85	64.84 D	9.29E-01	5.48E-01	5.54E-01	8.09E-01	6.13E-01	7.49E-01	4.90E-01	6.45E-01
SR-85M	67.66 M	3.73E-01	2.26E-01	2.25E-01	3.38E-01	2.57E-01	3.24E-01	2.01E-01	2.67E-01
SR-87M	2.805 H	5.68E-01	3.39E-01	3.41E-01	5.01E-01	3.77E-01	4.66E-01	3.03E-01	3.98E-01
SR-89	50.55 D	2.62E-04	1.56E-04	1.59E-04	2.27E-04	1.81E-04	2.16E-04	1.40E-04	1.82E-04
SR-90	28.6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SR-91	9.5 H	1.31E 00	7.79E-01	7.93E-01	1.13E 00	9.00E-01	1.08E 00	7.01E-01	9.12E-01
SR-92	2.71 H	2.50E 00	1.52E 00	1.54E 00	2.18E 00	1.74E 00	2.06E 00	1.40E 00	1.77E 00
SR-93	7.3 M	4.29E 00	2.59E 00	2.64E 00	3.75E 00	2.95E 00	3.52E 00	2.37E 00	3.02E 00

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
TE-131	25.0 M	4.92E-01	4.69E-01	5.19E-01	6.52E-01	4.61E-01	4.14E-01	4.91E-01	4.52E-01
TE-131M	30 H	1.72E 00	1.67E 00	1.87E 00	2.14E 00	1.64E 00	1.49E 00	1.75E 00	1.61E 00
TE-132	78.2 H	2.44E-01	2.25E-01	2.38E-01	3.64E-01	2.14E-01	1.94E-01	2.31E-01	2.16E-01
TE-133	12.45 M	1.11E 00	1.07E 00	1.19E 00	1.40E 00	1.05E 00	9.60E-01	1.12E 00	1.04E 00
TE-133M	55.4 M	2.69E 00	2.62E 00	2.94E 00	3.33E 00	2.59E 00	2.33E 00	2.75E 00	2.54E 00
TE-134	41.8 M	1.02E 00	9.73E-01	1.08E 00	1.32E 00	9.53E-01	8.58E-01	1.01E 00	9.35E-01
I-122	3.62 M	1.14E 00	1.08E 00	1.21E 00	1.43E 00	1.06E 00	9.54E-01	1.12E 00	1.04E 00
I-123	13.13 H	1.75E-01	1.62E-01	1.71E-01	2.78E-01	1.57E-01	1.38E-01	1.69E-01	1.55E-01
I-124	4.18 D	1.26E 00	1.23E 00	1.37E 00	1.59E 00	1.21E 00	1.10E 00	1.29E 00	1.19E 00
I-125	60.14 D	5.10E-03	6.73E-03	2.76E-03	3.53E-02	2.80E-03	3.11E-03	6.23E-03	4.09E-03
I-126	12.93 D	5.39E-01	5.14E-01	5.73E-01	6.82E-01	5.03E-01	4.54E-01	5.35E-01	4.94E-01
I-128	24.99 M	6.72E-02	8.24E-02	9.14E-02	1.12E-01	8.04E-02	7.24E-02	8.54E-02	7.91E-02
I-129	1.57E7 Y	4.23E-03	5.89E-03	2.71E-03	2.40E-02	2.64E-03	2.98E-03	4.77E-03	3.50E-03
I-130	12.36 H	2.55E 00	2.44E 00	2.73E 00	3.16E 00	2.40E 00	2.16E 00	2.55E 00	2.35E 00
I-131	8.040 D	4.43E-01	4.14E-01	4.56E-01	5.77E-01	4.04E-01	3.64E-01	4.29E-01	3.99E-01
I-132	2.30 H	2.76E 00	2.67E 00	2.99E 00	3.40E 00	2.63E 00	2.38E 00	2.79E 00	2.57E 00
I-133	20.8 H	7.13E-01	6.82E-01	7.63E-01	8.92E-01	6.69E-01	6.04E-01	7.10E-01	6.55E-01
I-134	52.6 M	3.19E 00	3.10E 00	3.49E 00	3.93E 00	3.07E 00	2.79E 00	3.26E 00	3.03E 00
I-135	6.61 H	1.90E 00	1.89E 00	2.13E 00	2.37E 00	1.88E 00	1.73E 00	2.00E 00	1.84E 00
I-136	83 S	3.17E 00	3.21E 00	3.59E 00	4.03E 00	3.20E 00	2.97E 00	3.40E 00	3.14E 00
XE-122	20.1 H	6.48E-02	6.15E-02	6.44E-02	1.04E-01	5.77E-02	5.20E-02	6.30E-02	5.77E-02
XE-123	2.14 H	7.24E-01	7.00E-01	7.75E-01	9.58E-01	6.87E-01	6.23E-01	7.32E-01	6.75E-01
XE-125	16.8 H	2.81E-01	2.62E-01	2.80E-01	4.13E-01	2.53E-01	2.27E-01	2.71E-01	2.51E-01
XE-127	36.406 D	2.96E-01	2.73E-01	2.91E-01	4.39E-01	2.64E-01	2.36E-01	2.82E-01	2.63E-01
XE-129M	8.89 D	1.77E-02	1.93E-02	1.48E-02	5.59E-02	1.38E-02	1.33E-02	1.79E-02	1.52E-02

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
IN-117	43.8 M	1.25E 00	7.40E-01	7.47E-01	1.10E 00	8.39E-01	1.03E 00	6.61E-01	8.74E-01
IN-117M	116.5 M	1.56E-01	9.21E-02	9.18E-02	1.39E-01	1.04E-01	1.31E-01	8.18E-02	1.09E-01
SN-113	115.1 D	2.42E-02	6.18E-03	6.29E-03	1.43E-02	7.18E-03	1.09E-02	4.90E-03	1.05E-02
SN-117M	13.60 D	2.58E-01	1.49E-01	1.48E-01	2.32E-01	1.75E-01	2.25E-01	1.31E-01	1.81E-01
SN-119M	293.0 D	9.79E-03	6.51E-04	7.45E-04	4.22E-03	9.27E-04	2.31E-03	1.95E-04	2.82E-03
SN-123	129.2 D	1.31E-02	7.06E-03	8.00E-03	1.14E-02	9.13E-03	1.09E-02	7.12E-03	9.18E-03
SN-125	9.64 D	5.86E-01	3.52E-01	3.59E-01	5.09E-01	4.05E-01	4.82E-01	3.21E-01	4.11E-01
SN-126	1.0E5 Y	8.77E-02	4.29E-02	4.35E-02	7.76E-02	5.82E-02	7.56E-02	3.71E-02	5.84E-02
SB-117	2.80 H	3.06E-01	1.75E-01	1.75E-01	2.71E-01	2.04E-01	2.61E-01	1.55E-01	2.13E-01
SB-122	2.70 D	8.16E-01	4.83E-01	4.89E-01	7.10E-01	5.45E-01	6.62E-01	4.32E-01	5.68E-01
SB-124	60.20 D	3.50E 00	2.17E 00	2.20E 00	3.13E 00	2.46E 00	2.93E 00	2.00E 00	2.53E 00
SB-125	2.77 Y	7.76E-01	4.54E-01	4.59E-01	6.75E-01	5.12E-01	6.28E-01	4.05E-01	5.37E-01
SB-126	12.4 D	5.14E 00	3.05E 00	3.10E 00	4.47E 00	3.48E 00	4.21E 00	2.73E 00	3.58E 00
SB-126M	19.0 M	2.92E 00	1.73E 00	1.76E 00	2.54E 00	1.97E 00	2.39E 00	1.55E 00	2.03E 00
SB-127	3.85 D	1.23E 00	7.27E-01	7.37E-01	1.07E 00	8.26E-01	1.00E 00	6.50E-01	8.54E-01
SB-129	4.40 H	2.73E 00	1.63E 00	1.66E 00	2.37E 00	1.87E 00	2.24E 00	1.48E 00	1.91E 00
TE-121	16.8 D	1.04E 00	6.06E-01	6.14E-01	8.99E-01	6.82E-01	8.34E-01	5.41E-01	7.17E-01
TE-121M	154 D	3.69E-01	2.16E-01	2.15E-01	3.27E-01	2.48E-01	3.12E-01	1.92E-01	2.58E-01
TE-123	1E13 Y	1.22E-02	1.01E-03	1.15E-03	5.87E-03	1.65E-03	3.50E-03	3.82E-04	3.86E-03
TE-123M	119.7 D	2.45E-01	1.43E-01	1.42E-01	2.22E-01	1.67E-01	2.15E-01	1.25E-01	1.73E-01
TE-125M	58 D	3.47E-02	3.79E-03	4.26E-03	1.85E-02	6.63E-03	1.21E-02	1.93E-03	1.22E-02
TE-127	9.35 H	8.60E-03	5.14E-03	5.17E-03	7.60E-03	5.73E-03	7.08E-03	4.60E-03	6.04E-03
TE-127M	109 D	1.11E-02	1.29E-03	1.44E-03	5.92E-03	2.16E-03	3.90E-03	6.92E-04	3.92E-03
TE-129	69.6 M	1.00E-01	5.75E-02	5.81E-02	8.63E-02	6.48E-02	7.97E-02	5.13E-02	6.85E-02
TE-129M	33.6 D	6.69E-02	3.58E-02	3.65E-02	5.53E-02	4.14E-02	5.10E-02	3.17E-02	4.38E-02

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
IN-117	43.8 M	7.86E-01	7.56E-01	8.14E-01	9.81E-01	8.20E-01	7.15E-01	6.48E-01	9.99E-01
IN-117M	116.5 M	9.63E-02	9.29E-02	1.01E-01	1.33E-01	1.01E-01	8.40E-02	7.96E-02	1.36E-01
SN-113	115.1 D	8.13E-03	6.19E-03	7.36E-03	1.01E-02	6.40E-03	5.86E-03	5.35E-03	1.05E-02
SN-117M	13.60 D	1.54E-01	1.50E-01	1.65E-01	2.44E-01	1.55E-01	1.30E-01	1.26E-01	2.50E-01
SN-119M	293.0 D	1.81E-03	6.56E-04	1.11E-03	1.77E-03	3.95E-04	7.71E-04	5.44E-04	1.90E-03
SN-123	129.2 D	8.57E-03	8.12E-03	8.63E-03	9.17E-03	8.72E-03	7.83E-03	7.03E-03	9.32E-03
SN-125	9.64 D	3.85E-01	3.64E-01	3.87E-01	4.12E-01	3.92E-01	3.48E-01	3.15E-01	4.19E-01
SN-126	1.0E5 Y	4.79E-02	4.54E-02	5.05E-02	8.64E-02	3.52E-02	3.81E-02	3.28E-02	8.89E-02
SB-117	2.80 H	1.83E-01	1.76E-01	1.93E-01	2.75E-01	1.84E-01	1.56E-01	1.49E-01	2.81E-01
SB-122	2.70 D	5.18E-01	4.96E-01	5.31E-01	6.00E-01	5.42E-01	4.78E-01	4.27E-01	6.10E-01
SB-124	60.20 D	2.37E 00	2.25E 00	2.38E 00	2.55E 00	2.42E 00	2.12E 00	1.95E 00	2.59E 00
SB-125	2.77 Y	4.87E-01	4.65E-01	5.00E-01	5.80E-01	5.09E-01	4.45E-01	4.00E-01	5.90E-01
SB-126	12.4 D	3.29E 00	3.13E 00	3.35E 00	3.74E 00	3.42E 00	3.03E 00	2.70E 00	3.80E 00
SB-126M	19.0 M	1.86E 00	1.78E 00	1.90E 00	2.14E 00	1.94E 00	1.71E 00	1.53E 00	2.18E 00
SB-127	3.85 D	7.82E-01	7.46E-01	7.99E-01	9.02E-01	8.15E-01	7.19E-01	6.43E-01	9.17E-01
SB-129	4.40 H	1.77E 00	1.64E 00	1.79E 00	1.94E 00	1.82E 00	1.62E 00	1.45E 00	1.97E 00
TE-121	16.8 D	6.52E-01	6.21E-01	6.67E-01	7.59E-01	6.80E-01	6.00E-01	5.35E-01	7.72E-01
TE-121M	154 D	2.28E-01	2.18E-01	2.37E-01	3.14E-01	2.37E-01	1.95E-01	1.87E-01	3.21E-01
TE-123	1E13 Y	2.86E-03	1.10E-03	1.67E-03	2.72E-03	5.97E-04	1.18E-03	8.03E-04	2.87E-03
TE-123M	119.7 D	1.48E-01	1.43E-01	1.57E-01	2.33E-01	1.48E-01	1.24E-01	1.20E-01	2.39E-01
TE-125M	58 D	9.87E-03	4.34E-03	5.93E-03	9.83E-03	2.32E-03	4.24E-03	2.91E-03	1.03E-02
TE-127	9.35 H	5.44E-03	5.23E-03	5.64E-03	6.80E-03	5.79E-03	4.92E-03	4.51E-03	6.91E-03
TE-127M	109 D	3.14E-03	1.46E-03	1.97E-03	3.23E-03	8.30E-04	1.42E-03	9.96E-04	3.37E-03
TE-129	69.6 M	6.21E-02	5.89E-02	6.33E-02	7.36E-02	6.44E-02	5.62E-02	5.07E-02	7.49E-02
TE-129M	33.6 D	3.99E-02	3.69E-02	3.98E-02	4.47E-02	3.97E-02	3.59E-02	3.16E-02	4.55E-02

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
IN-117	43.8 M	8.04E-01	7.60E-01	8.42E-01	1.05E 00	7.44E-01	6.67E-01	7.91E-01	7.30E-01
IN-117M	116.5 M	1.01E-01	9.33E-02	1.01E-01	1.44E-01	9.11E-02	8.12E-02	9.68E-02	9.02E-02
SN-113	115.1 D	7.10E-03	6.66E-03	6.24E-03	2.05E-02	5.74E-03	5.20E-03	7.15E-03	6.13E-03
SN-117M	13.60 D	1.64E-01	1.50E-01	1.60E-01	2.61E-01	1.47E-01	1.29E-01	1.58E-01	1.45E-01
SN-119M	293.0 D	8.86E-04	9.60E-04	3.86E-04	7.93E-03	4.14E-04	4.19E-04	1.13E-03	6.83E-04
SN-123	129.2 D	8.31E-03	8.16E-03	9.20E-03	1.02E-02	8.07E-03	7.38E-03	8.60E-03	7.91E-03
SN-125	9.64 D	3.71E-01	3.66E-01	4.11E-01	4.59E-01	3.62E-01	3.31E-01	3.85E-01	3.55E-01
SN-126	1.0E5 Y	4.50E-02	4.60E-02	4.62E-02	9.45E-02	4.20E-02	3.69E-02	4.58E-02	4.04E-02
SB-117	2.80 H	1.92E-01	1.77E-01	1.90E-01	2.97E-01	1.73E-01	1.53E-01	1.86E-01	1.71E-01
SB-122	2.70 D	5.23E-01	4.99E-01	5.57E-01	6.52E-01	4.89E-01	4.40E-01	5.19E-01	4.78E-01
SB-124	60.20 D	2.27E 00	2.25E 00	2.53E 00	2.85E 00	2.23E 00	2.05E 00	2.37E 00	2.18E 00
SB-125	2.77 Y	4.94E-01	4.68E-01	5.19E-01	6.34E-01	4.57E-01	4.11E-01	4.86E-01	4.49E-01
SB-126	12.4 D	3.29E 00	3.15E 00	3.53E 00	4.08E 00	3.10E 00	2.80E 00	3.29E 00	3.03E 00
SB-126M	19.0 M	1.87E 00	1.79E 00	2.00E 00	2.33E 00	1.75E 00	1.58E 00	1.86E 00	1.72E 00
SB-127	3.85 D	7.86E-01	7.51E-01	8.39E-01	9.81E-01	7.37E-01	6.64E-01	7.83E-01	7.22E-01
SB-129	4.40 H	1.73E 00	1.69E 00	1.90E 00	2.14E 00	1.67E 00	1.52E 00	1.77E 00	1.63E 00
TE-121	16.8 D	6.57E-01	6.26E-01	6.97E-01	8.34E-01	6.11E-01	5.51E-01	6.51E-01	5.99E-01
TE-121M	154 D	2.38E-01	2.20E-01	2.36E-01	3.43E-01	2.13E-01	1.92E-01	2.27E-01	2.12E-01
TE-123	1E13 Y	1.31E-03	1.60E-03	6.31E-04	1.02E-02	6.59E-04	7.10E-04	1.65E-03	1.03E-03
TE-123M	119.7 D	1.56E-01	1.44E-01	1.53E-01	2.48E-01	1.40E-01	1.23E-01	1.51E-01	1.39E-01
TE-125M	58 D	4.63E-03	6.01E-03	2.67E-03	3.01E-02	2.68E-03	2.90E-03	5.58E-03	3.75E-03
TE-127	9.35 H	5.62E-03	5.26E-03	5.80E-03	7.29E-03	5.14E-03	4.61E-03	5.44E-03	5.06E-03
TE-127M	109 D	1.56E-03	1.95E-03	9.73E-04	9.58E-03	9.54E-04	9.98E-04	1.85E-03	1.28E-03
TE-129	69.6 M	6.24E-02	5.94E-02	6.56E-02	8.23E-02	5.78E-02	5.21E-02	6.16E-02	5.69E-02
TE-129M	33.6 D	3.88E-02	3.75E-02	4.12E-02	5.32E-02	3.62E-02	3.20E-02	3.91E-02	3.57E-02

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/CUBIC CM

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
PD-103	16.961 D	1.07E-02	4.44E-04	4.92E-04	3.25E-03	3.67E-04	1.40E-03	1.34E-04	2.36E-03
PD-107	6.5E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PD-109	13.453 H	1.25E-03	7.39E-04	7.46E-04	1.09E-03	8.25E-04	1.01E-03	6.61E-04	8.59E-04
AG-106M	8.46 D	5.24E 00	3.13E 00	3.17E 00	4.56E 00	3.57E 00	4.29E 00	2.83E 00	3.[illegible]6E 00
AG-108	2.37 M	3.24E-02	1.91E-02	1.93E-02	2.81E-02	2.15E-02	2.62E-02	1.70E-02	2.24E-02
AG-108M	127 Y	2.98E 00	1.74E 00	1.79E 00	2.59E 00	2.00E 00	2.43E 00	1.58E 00	2.07E 00
AG-109M	39.6 S	1.19E-02	3.35E-03	3.42E-03	7.47E-03	4.37E-03	6.27E-03	2.73E-03	5.52E-03
AG-110	24.57 S	5.71E-02	3.38E-02	3.44E-02	4.96E-02	3.85E-02	4.66E-02	3.02E-02	3.97E-02
AG-110M	249.85 D	5.17E 00	3.09E 00	3.14E 00	4.49E 00	3.55E 00	4.25E 00	2.79E 00	3.61E 00
AG-111	7.46 D	4.64E-02	2.79E-02	2.79E-02	4.13E-02	3.11E-02	3.87E-02	2.49E-02	3.27E-02
CD-109	464 D	1.18E-02	5.29E-04	6.05E-04	4.20E-03	5.50E-04	1.96E-03	8.74E-05	2.90E-03
CD-111M	48.7 M	4.89E-01	2.92E-01	2.91E-01	4.39E-01	3.32E-01	4.19E-01	2.60E-01	3.46E-01
CD-113	9.3E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-113M	13.7 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-115	53.46 H	3.69E-01	2.19E-01	2.21E-01	3.23E-01	2.45E-01	2.99E-01	1.96E-01	2.57E-01
CD-115M	44.6 D	4.16E-02	2.49E-02	2.53E-02	3.61E-02	2.88E-02	3.44E-02	2.26E-02	2.91E-02
CD-117	2.49 H	2.05E 00	1.24E 00	1.25E 00	1.79E 00	1.41E 00	1.69E 00	1.13E 00	1.44E 00
CD-117M	3.36 H	4.03E 00	2.47E 00	2.52E 00	3.54E 00	2.80E 00	3.31E 00	2.29E 00	2.87E 00
IN-111	2.83 D	6.83E-01	4.07E-01	4.04E-01	6.14E-01	4.64E-01	5.88E-01	3.61E-01	4.83E-01
IN-113M	1.658 H	4.57E-01	2.70E-01	2.71E-01	4.01E-01	3.01E-01	3.72E-01	2.41E-01	3.18E-01
IN-114	71.9 S	5.86E-02	3.47E-02	3.52E-02	5.10E-02	3.92E-02	4.76E-02	3.11E-02	4.08E-02
IN-114M	49.51 D	1.68E-01	9.58E-02	9.67E-02	1.44E-01	1.10E-01	1.36E-01	8.52E-02	1.15E-01
IN-115	4.6E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IN-115M	4.36 H	2.84E-01	1.67E-01	1.67E-01	2.49E-01	1.86E-01	2.32E-01	1.49E-01	1.97E-01
IN-116M	54.15 M	4.69E 00	2.84E 00	2.89E 00	4.09E 00	3.26E 00	3.86E 00	2.61E 00	3.31E 00

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
PD-103	16.961 D	7.79E-04	3.49E-04	7.63E-04	1.07E-03	3.49E-04	5.23E-04	4.35E-04	1.21E-03
PD-107	6.5E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PD-109	13.453 H	7.89E-04	7.56E-04	8.12E-04	9.36E-04	8.31E-04	7.26E-04	6.51E-04	9.50E-04
AG-106M	8.46 D	3.39E 00	3.22E 00	3.44E 00	3.77E 00	3.49E 00	3.09E 00	2.78E 00	3.83E 00
AG-108	2.37 M	2.05E-02	1.95E-02	2.10E-02	2.37E-02	2.14E-02	1.89E-02	1.68E-02	2.41E-02
AG-108M	127 Y	1.89E 00	1.81E 00	1.94E 00	2.19E 00	1.98E 00	1.74E 00	1.56E 00	2.22E 00
AG-109M	39.6 S	3.99E-03	3.45E-03	4.07E-03	6.83E-03	2.76E-03	3.04E-03	2.62E-03	7.09E-03
AG-110	24.57 S	3.64E-02	3.47E-02	3.72E-02	4.13E-02	3.79E-02	3.37E-02	2.99E-02	4.20E-02
AG-110M	249.85 D	3.35E 00	3.18E 00	3.39E 00	3.67E 00	3.44E 00	3.07E 00	2.75E 00	3.73E 00
AG-111	7.46 D	2.93E-02	2.83E-02	3.05E-02	3.50E-02	3.14E-02	2.61E-02	2.44E-02	3.87E-02
CD-109	464 D	1.32E-03	4.47E-04	9.64E-04	1.46E-03	3.32E-04	6.46E-04	4.87E-04	1.62E-03
CD-111M	48.7 M	3.04E-01	2.94E-01	3.20E-01	4.34E-01	3.21E-01	2.62E-01	2.52E-01	4.43E-01
CD-113	9.3E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-113M	13.7 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-115	53.46 H	2.34E-01	2.24E-01	2.40E-01	2.78E-01	2.46E-01	2.15E-01	1.93E-01	2.82E-01
CD-115M	44.6 D	2.71E-02	2.57E-02	2.74E-02	2.92E-02	2.77E-02	2.48E-02	2.22E-02	2.97E-02
CD-117	2.49 H	1.34E 00	1.28E 00	1.36E 00	1.47E 00	1.37E 00	1.20E 00	1.11E 00	1.50E 00
CD-117M	3.36 H	2.72E 00	2.57E 00	2.71E 00	2.84E 00	2.75E 00	2.39E 00	2.23E 00	2.89E 00
IN-111	2.83 D	4.22E-01	4.08E-01	4.45E-01	6.13E-01	4.43E-01	3.62E-01	3.49E-01	6.26E-01
IN-113M	1.658 H	2.86E-01	2.75E-01	2.96E-01	3.97E-01	3.05E-01	2.58E-01	2.37E-01	3.63E-01
IN-114	71.9 S	3.73E-02	3.56E-02	3.82E-02	4.29E-02	3.89E-02	3.44E-02	3.07E-02	4.36E-02
IN-114M	49.51 D	1.03E-01	9.77E-02	1.06E-01	1.28E-01	1.06E-01	9.18E-02	8.39E-02	1.31E-01
IN-115	4.6E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IN-115M	4.36 H	1.76E-01	1.69E-01	1.83E-01	2.27E-01	1.88E-01	1.57E-01	1.46E-01	2.31E-01
IN-116M	54.15 M	3.11E 00	2.95E 00	3.12E 00	3.30E 00	3.15E 00	2.79E 00	2.55E 00	3.35E 00

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/CUBIC CM

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
PD-103	16.961 D	6.70E-04	3.62E-04	2.09E-04	7.[illegible]E-03	3.04E-04	2.38E-04	5.29E-04	4.97E-04
PD-107	6.5E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PD-109	13.453 H	8.02E-04	7.61E-04	8.48E-04	1.01E-03	7.43E-04	6.69E-04	7.89E-04	7.29E-04
AG-106M	8.46 D	3.33E 00	3.24E 00	3.63E 00	4.15E 00	3.19E 00	2.90E 00	3.39E 00	3.13E 00
AG-108	2.37 M	2.06E-02	1.97E-02	2.20E-02	2.59E-02	1.93E-02	1.74E-02	2.05E-02	1.89E-02
AG-108M	127 Y	1.91E 00	1.82E 00	2.03E 00	2.38E 00	1.78E 00	1.61E 00	1.90E 00	1.75E 00
AG-109M	39.6 S	3.64E-03	3.55E-03	3.48E-03	1.10E-02	3.20E-03	2.79E-03	3.72E-03	3.21E-03
AG-110	24.57 S	3.65E-02	3.50E-02	3.92E-02	4.50E-02	3.44E-02	3.10E-02	3.65E-02	3.36E-02
AG-110M	249.85 D	3.29E 00	3.20E 00	3.60E 00	4.05E 00	3.16E 00	2.87E 00	3.36E 00	3.09E 00
AG-111	7.45 D	3.07E-02	2.84E-02	3.10E-02	4.06E-02	2.77E-02	2.49E-02	2.93E-02	2.74E-02
CD-109	464 D	7.94E-04	5.99E-04	2.77E-04	9.05E-03	3.14E-04	2.74E-04	8.72E-04	5.85E-04
CD-111M	48.7 M	3.23E-01	2.95E-01	3.17E-01	4.62E-01	2.88E-01	2.57E-01	3.06E-01	2.86E-01
CD-113	9.3E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-113M	13.7 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-115	53.46 H	2.37E-01	2.25E-01	2.51E-01	3.00E-01	2.20E-01	1.98E-01	2.34E-01	2.16E-01
CD-115M	44.6 D	2.64E-02	2.58E-02	2.91E-02	3.24E-02	2.55E-02	2.33E-02	2.72E-02	2.50E-02
CD-117	2.49 H	1.30E 00	1.28E 00	1.43E 00	1.64E 00	1.26E 00	1.16E 00	1.34E 00	1.24E 00
CD-117M	3.36 H	2.55E 00	2.56E 00	2.87E 00	3.21E 00	2.55E 00	2.33E 00	2.71E 00	2.50E 00
IN-111	2.83 D	4.49E-01	4.10E-01	4.40E-01	6.54E-01	4.00E-01	3.56E-01	4.25E-01	3.98E-01
IN-113M	1.658 H	2.96E-01	2.77E-01	3.04E-01	3.86E-01	2.70E-01	2.42E-01	2.86E-01	2.66E-01
IN-114	71.9 S	3.75E-02	3.58E-02	4.01E-02	4.68E-02	3.51E-02	3.17E-02	3.73E-02	3.44E-02
IN-114M	49.51 D	1.04E-01	9.84E-02	1.08E-01	1.43E-01	9.61E-02	8.63E-02	1.03E-01	9.47E-02
IN-115	4.6E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IN-115M	4.36 H	1.84E-01	1.70E-01	1.86E-01	2.47E-01	1.66E-01	1.49E-01	1.76E-01	1.64E-01
IN-116M	54.15 M	2.96E 00	2.95E 00	3.32E 00	3.70E 00	2.92E 00	2.69E 00	3.11E 00	2.87E 00

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	PED MARROW	OVARIES	PANCREAS	SKELETON
BA-141	18.27 M	1.06E 00	1.01E 00	1.08E 00	1.25E 00	1.10E 00	9.46E-01	8.72E-01	1.27E 00
BA-142	10.70 M	1.10E 00	1.04E 00	1.11E 00	1.22E 00	1.12E 00	9.93E-01	8.98E-01	1.24E 00
LA-140	40.22 H	2.94E 00	2.79E 00	2.95E 00	3.13E 00	2.99E 00	2.61E 00	2.42E 00	3.18E 00
LA-141	3.94 H	5.35E-02	5.07E-02	5.36E-02	5.60E-02	5.40E-02	4.78E-02	4.40E-02	5.69E-02
LA-142	95.4 M	3.84E 00	3.59E 00	3.77E 00	3.92E 00	3.85E 00	3.27E 00	3.14E 00	3.98E 00
CE-139	137.66 D	1.57E-01	1.47E-01	1.62E-01	2.39E-01	1.51E-01	1.28E-01	1.23E-01	2.45E-01
CE-141	32.50 D	7.91E-02	7.63E-02	8.40E-02	1.28E-01	7.63E-02	6.60E-02	6.29E-02	1.31E-01
CE-143	33.0 H	2.94E-01	2.79E-01	3.01E-01	3.70E-01	3.01E-01	2.60E-01	2.38E-01	3.77E-01
CE-144	284.3 D	1.86E-02	1.75E-02	1.94E-02	3.05E-02	1.64E-02	1.50E-02	1.40E-02	3.13E-02
PR-142	19.13 H	7.49E-02	7.09E-02	7.48E-02	7.77E-02	7.55E-02	6.61E-02	6.16E-02	7.90E-02
PR-143	13.56 D	1.08E-08	1.03E-08	1.10E-08	1.21E-08	1.12E-08	9.99E-09	8.86E-09	1.23E-08
PR-144	17.28 M	4.33E-02	4.08E-02	4.31E-02	4.52E-02	4.37E-02	3.77E-02	3.54E-02	4.59E-02
PR-144M	7.2 M	6.20E-03	3.53E-03	4.03E-03	7.08E-03	1.62E-03	2.93E-03	1.94E-03	7.24E-03
ND-147	10.98 D	1.48E-01	1.39E-01	1.50E-01	1.94E-01	1.41E-01	1.29E-01	1.14E-01	1.97E-01
ND-149	1.73 H	4.22E-01	4.04E-01	4.36E-01	5.55E-01	4.35E-01	3.72E-01	3.44E-01	5.66E-01
PM-143	265 D	3.62E-01	3.38E-01	3.62E-01	4.05E-01	3.61E-01	3.27E-01	2.88E-01	4.12E-01
PM-144	363 D	1.82E 00	1.74E 00	1.86E 00	2.09E 00	1.89E 00	1.68E 00	1.49E 00	2.12E 00
PM-145	17.7 Y	1.91E-02	1.21E-02	1.35E-02	2.39E-02	5.99E-03	9.88E-03	6.81E-03	2.44E-02
PM-146	2020 D	8.78E-01	8.35E-01	8.94E-01	1.01E 00	9.09E-01	8.04E-01	7.17E-01	1.03E 00
PM-147	2.6234 Y	3.65E-06	3.59E-06	3.97E-06	6.29E-06	3.43E-06	3.09E-06	2.91E-06	6.47E-06
PM-148	5.37 D	7.06E-01	6.71E-01	7.12E-01	7.62E-01	7.21E-01	6.38E-01	5.80E-01	7.75E-01
PM-148M	41.3 D	2.36E 00	2.25E 00	2.41E 00	2.71E 00	2.46E 00	2.17E 00	1.94E 00	2.75E 00
PM-149	53.08 H	1.30E-02	1.25E-02	1.35E-02	1.68E-02	1.39E-02	1.16E-02	1.08E-02	1.71E-02
PM-151	28.40 H	3.75E-01	3.58E-01	3.87E-01	4.79E-01	3.88E-01	3.33E-01	3.06E-01	4.88E-01
SM-147	1.0609E11 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
BA-141	18.27 M	1.05E 00	1.01E 00	1.12E 00	1.36E 00	9.97E-01	9.05E-01	1.06E 00	9.81E-01
BA-142	10.70 M	1.07E 00	1.05E 00	1.17E 00	1.35E 00	1.03E 00	9.39E-01	1.10E 00	1.01E 00
LA-140	40.22 H	2.79E 00	2.79E 00	3.13E 00	3.52E 00	2.76E 00	2.55E 00	2.94E 00	2.71E 00
LA-141	3.94 H	5.06E-02	5.07E-02	5.72E-02	6.31E-02	5.03E-02	4.65E-02	5.35E-02	4.93E-02
LA-142	95.4 M	3.52E 00	3.58E 00	3.98E 00	4.50E 00	3.57E 00	3.32E 00	3.79E 00	3.51E 00
CE-139	137.66 D	1.60E-01	1.50E-01	1.55E-01	2.63E-01	1.43E-01	1.27E-01	1.54E-01	1.42E-01
CE-141	32.50 D	8.26E-02	7.69E-02	8.10E-02	1.34E-01	7.46E-02	6.54E-02	8.03E-02	7.34E-02
CE-143	33.0 H	2.97E-01	2.83E-01	3.05E-01	4.11E-01	2.71E-01	2.45E-01	2.90E-01	2.68E-01
CE-144	284.3 D	1.86E-02	1.78E-02	1.83E-02	3.30E-02	1.68E-02	1.48E-02	1.83E-02	1.65E-02
PR-142	19.13 H	6.99E-02	7.09E-02	7.98E-02	8.82E-02	7.03E-02	6.53E-02	7.49E-02	6.91E-02
PR-143	13.56 D	1.08E-08	1.03E-08	1.16E-08	1.32E-08	1.02E-08	9.20E-09	1.08E-08	9.96E-09
PR-144	17.28 M	4.04E-02	4.07E-02	4.55E-02	5.12E-02	4.05E-02	3.74E-02	4.30E-02	3.97E-02
PR-144M	7.2 M	3.04E-03	4.92E-03	2.32E-03	1.35E-02	2.17E-03	2.45E-03	3.47E-03	2.60E-03
ND-147	10.98 D	1.45E-01	1.41E-01	1.50E-01	2.15E-01	1.33E-01	1.20E-01	1.44E-01	1.31E-01
ND-149	1.73 H	4.33E-01	4.07E-01	4.42E-01	5.97E-01	3.95E-01	3.54E-01	4.20E-01	3.89E-01
PM-143	265 D	3.52E-01	3.43E-01	3.77E-01	4.57E-01	3.31E-01	3.01E-01	3.55E-01	3.25E-01
PM-144	363 D	1.82E 00	1.75E 00	1.95E 00	2.29E 00	1.71E 00	1.54E 00	1.82E 00	1.68E 00
PM-145	17.7 Y	1.04E-02	1.47E-02	8.75E-03	4.02E-02	8.06E-03	8.62E-03	1.16E-02	9.04E-03
PM-146	2020 D	8.79E-01	8.41E-01	9.36E-01	1.11E 00	8.22E-01	7.42E-01	8.75E-01	8.06E-01
PM-147	2.6234 Y	3.85E-06	3.60E-06	3.83E-06	6.41E-06	3.53E-06	3.05E-06	3.80E-06	3.43E-06
PM-148	5.37 D	6.81E-01	6.73E-01	7.56E-01	8.49E-01	6.64E-01	6.09E-01	7.07E-01	6.51E-01
PM-148M	41.3 D	2.37E 00	2.27E 00	2.53E 00	2.95E 00	2.22E 00	2.01E 00	2.36E 00	2.18E 00
PM-149	53.08 H	1.35E-02	1.26E-02	1.37E-02	1.80E-02	1.23E-02	1.10E-02	1.30E-02	1.22E-02
PM-151	28.40 H	3.83E-01	3.61E-01	3.94E-01	5.19E-01	3.51E-01	3.15E-01	3.73E-01	3.46E-01
SM-147	1.06E11 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/Y* PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
XE-131M	11.84 D	2.31E-02	5.52E-03	5.77E-03	1.52E-02	8.04E-03	1.19E-02	4.16E-03	1.06E-02
XE-133	5.245 D	6.72E-02	2.92E-02	2.98E-02	5.72E-02	4.14E-02	5.42E-02	2.49E-02	4.22E-02
XE-133M	2.19 D	5.97E-02	2.74E-02	2.76E-02	4.80E-02	3.28E-02	4.30E-02	2.37E-02	3.65E-02
XE-135	9.11 H	4.32E-01	2.60E-01	2.59E-01	3.87E-01	2.94E-01	3.68E-01	2.32E-01	3.06E-01
XE-135M	15.36 M	7.80E-01	4.60E-01	4.65E-01	6.80E-01	5.15E-01	6.30E-01	4.11E-01	5.42E-01
XE-137	3.83 M	3.43E-01	2.06E-01	2.08E-01	3.01E-01	2.30E-01	2.90E-01	1.86E-01	2.41E-01
XE-138	14.13 M	2.23E 00	1.37E 00	1.39E 00	1.96E 00	1.54E 00	1.82E 00	1.28E 00	1.59E 00
CS-126	1.64 M	2.05E 00	1.22E 00	1.23E 00	1.79E 00	1.36E 00	1.66E 00	1.09E 00	1.43E 00
CS-129	32.06 H	4.80E-01	2.71E-01	2.72E-01	4.14E-01	3.05E-01	3.80E-01	2.40E-01	3.26E-01
CS-131	9.688 D	2.39E-02	2.90E-03	3.28E-03	1.37E-02	5.57E-03	9.36E-03	1.58E-03	8.91E-03
CS-132	6.475 D	1.32E 00	7.70E-01	7.83E-01	1.14E 00	8.81E-01	1.07E 00	6.88E-01	9.10E-01
CS-134	2.062 Y	2.92E 00	1.73E 00	1.76E 00	2.53E 00	1.98E 00	2.39E 00	1.55E 00	2.03E 00
CS-134M	2.90 H	3.95E-02	1.86E-02	1.87E-02	3.33E-02	2.35E-02	3.11E-02	1.59E-02	2.51E-02
CS-135	2.3E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-136	13.16 D	4.09E 00	2.44E 00	2.48E 00	3.55E 00	2.82E 00	3.38E 00	2.19E 00	2.86E 00
CS-137	30.17 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-138	32.2 M	4.56E 00	2.79E 00	2.84E 00	4.01E 00	3.17E 00	3.74E 00	2.58E 00	3.24E 00
CS-139	9.40 M	5.97E-01	3.67E-01	3.73E-01	5.25E-01	4.17E-01	4.90E-01	3.41E-01	4.25E-01
BA-131	11.8 D	8.26E-01	4.77E-01	4.80E-01	7.21E-01	5.42E-01	6.72E-01	4.24E-01	5.70E-01
BA-133	10.5 Y	6.62E-01	3.75E-01	3.76E-01	5.79E-01	4.30E-01	5.38E-01	3.33E-01	4.54E-01
BA-133M	38.9 H	1.06E-01	5.54E-02	5.56E-02	9.01E-02	6.48E-02	8.26E-02	4.87E-02	6.96E-02
BA-135M	28.7 H	9.48E-02	4.83E-02	4.85E-02	7.97E-02	5.69E-02	7.28E-02	4.23E-02	6.13E-02
BA-137M	2.552 M	1.12E 00	6.59E-01	6.70E-01	9.68E-01	7.52E-01	9.10E-01	5.89E-01	7.75E-01
BA-139	83.1 M	6.10E-02	3.67E-02	3.65E-02	5.56E-02	4.28E-02	5.39E-02	3.26E-02	4.37E-02
BA-140	12.789 D	3.40E-01	2.00E-01	2.02E-01	2.97E-01	2.25E-01	2.76E-01	1.78E-01	2.36E-01

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
XE-131M	11.84 D	9.14E-03	5.97E-03	7.06E-03	1.11E-02	4.79E-03	5.35E-03	4.44E-03	1.14E-02
XE-133	5.245 D	3.53E-02	3.15E-02	3.51E-02	6.05E-02	2.30E-02	2.63E-02	2.19E-02	6.23E-02
XE-133M	2.19 D	3.21E-02	2.80E-02	3.10E-02	4.28E-02	2.93E-02	2.51E-02	2.35E-02	4.38E-02
XE-135	9.11 H	2.72E-01	2.63E-01	2.84E-01	3.71E-01	2.91E-01	2.37E-01	2.26E-01	3.79E-01
XE-135M	15.36 M	4.93E-01	4.71E-01	5.06E-01	5.80E-01	5.17E-01	4.53E-01	4.06E-01	5.90E-01
XE-137	3.83 M	2.21E-01	2.11E-01	2.26E-01	2.57E-01	2.31E-01	2.00E-01	1.82E-01	2.61E-01
XE-138	14.13 M	1.50E 00	1.42E 00	1.50E 00	1.61E 00	1.52E 00	1.30E 00	1.24E 00	1.64E 00
CS-126	1.64 M	1.30E 00	1.25E 00	1.34E 00	1.53E 00	1.37E 00	1.19E 00	1.07E 00	1.56E 00
CS-129	32.06 H	2.93E-01	2.76E-01	2.99E-01	3.63E-01	3.03E-01	2.60E-01	2.37E-01	3.69E-01
CS-131	9.688 D	7.73E-03	3.51E-03	4.54E-03	7.65E-03	1.68E-03	3.26E-03	2.14E-03	7.94E-03
CS-132	6.475 D	8.35E-01	7.92E-01	8.49E-01	9.45E-01	8.62E-01	7.69E-01	6.82E-01	9.61E-01
CS-134	2.062 Y	1.87E 00	1.78E 00	1.90E 00	2.10E 00	1.94E 00	1.72E 00	1.53E 00	2.14E 00
CS-134M	2.90 H	2.13E-02	1.90E-02	2.13E-02	3.36E-02	1.76E-02	1.65E-02	1.51E-02	3.46E-02
CS-135	2.3E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-136	13.16 D	2.64E 00	2.51E 00	2.68E 00	2.94E 00	2.71E 00	2.41E 00	2.14E 00	2.99E 00
CS-137	30.17 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-138	32.2 M	3.06E 00	2.90E 00	3.06E 00	3.22E 00	3.10E 00	2.70E 00	2.52E 00	3.27E 00
CS-139	9.40 M	4.04E-01	3.81E-01	4.02E-01	4.19E-01	4.07E-01	3.54E-01	3.32E-01	4.25E-01
BA-131	11.8 D	5.12E-01	4.87E-01	5.26E-01	6.45E-01	5.26E-01	4.57E-01	4.16E-01	6.57E-01
BA-133	10.5 Y	4.05E-01	3.83E-01	4.15E-01	5.33E-01	4.11E-01	3.52E-01	3.24E-01	5.43E-01
BA-133M	38.9 H	6.22E-02	5.66E-02	6.17E-02	8.17E-02	6.06E-02	5.11E-02	4.78E-02	8.33E-02
BA-135M	28.7 H	5.48E-02	4.94E-02	5.40E-02	7.21E-02	5.25E-02	4.45E-02	4.15E-02	7.36E-02
BA-137M	2.552 M	7.11E-01	6.78E-01	7.26E-01	8.07E-01	7.39E-01	6.58E-01	5.84E-01	8.20E-01
BA-139	83.1 M	3.82E-02	3.70E-02	4.03E-02	5.62E-02	3.87E-02	3.26E-02	3.13E-02	5.76E-02
BA-140	12.789 D	2.14E-01	2.04E-01	2.20E-01	2.59E-01	2.23E-01	1.94E-01	1.75E-01	2.63E-01

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/CUBIC CM

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
XE-131M	11.84 D	6.26E-03	6.88E-03	5.15E-03	2.13E-02	4.84E-03	4.64E-03	6.43E-03	5.38E-03
XE-133	5.245 D	3.06E-02	3.25E-02	3.10E-02	7.11E-02	2.81E-02	2.52E-02	3.13E-02	2.74E-02
XE-133M	2.19 D	3.06E-02	2.91E-02	2.89E-02	5.53E-02	2.64E-02	2.40E-02	2.93E-02	2.69E-02
XE-135	9.11 H	2.87E-01	2.64E-01	2.85E-01	3.95E-01	2.57E-01	2.30E-01	2.72E-01	2.56E-01
XE-135M	15.36 M	4.99E-01	4.74E-01	5.29E-01	6.30E-01	4.63E-01	4.17E-01	4.92E-01	4.54E-01
XE-137	3.83 M	2.21E-01	2.12E-01	2.36E-01	2.80E-01	2.08E-01	1.88E-01	2.20E-01	2.04E-01
XE-138	14.13 M	1.41E 00	1.42E 00	1.58E 00	1.81E 00	1.41E 00	1.30E 00	1.50E 00	1.39E 00
CS-126	1.64 M	1.32E 00	1.25E 00	1.39E 00	1.66E 00	1.22E 00	1.10E 00	1.30E 00	1.20E 00
CS-129	32.06 H	2.96E-01	2.80E-01	3.03E-01	4.08E-01	2.69E-01	2.42E-01	2.88E-01	2.66E-01
CS-131	9.688 D	3.46E-03	4.73E-03	2.04E-03	2.13E-02	2.03E-03	2.31E-03	3.90E-03	2.83E-03
CS-132	6.475 D	8.32E-01	7.99E-01	8.92E-01	1.04E 00	7.82E-01	7.06E-01	8.37E-01	7.66E-01
CS-134	2.062 Y	1.86E 00	1.79E 00	2.01E 00	2.30E 00	1.76E 00	1.59E 00	1.87E 00	1.72E 00
CS-134M	2.90 H	2.02E-02	1.97E-02	1.95E-02	4.03E-02	1.80E-02	1.59E-02	2.01E-02	1.79E-02
CS-135	2.3E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-136	13.16 D	2.60E 00	2.52E 00	2.83E 00	3.24E 00	2.49E 00	2.26E 00	2.65E 00	2.44E 00
CS-137	30.17 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-138	32.2 M	2.89E 00	2.89E 00	3.24E 00	3.64E 00	2.87E 00	2.65E 00	3.06E 00	2.82E 00
CS-139	9.40 M	3.77E-01	3.81E-01	4.27E-01	4.76E-01	3.79E-01	3.51E-01	4.03E-01	3.72E-01
BA-131	11.8 D	5.19E-01	4.91E-01	5.37E-01	7.08E-01	4.76E-01	4.28E-01	5.08E-01	4.69E-01
BA-133	10.5 Y	4.11E-01	3.87E-01	4.15E-01	5.89E-01	3.71E-01	3.33E-01	3.96E-01	3.67E-01
BA-133M	38.9 H	6.13E-02	5.80E-02	5.98E-02	9.70E-02	5.40E-02	4.89E-02	5.85E-02	5.43E-02
BA-135M	28.7 H	5.35E-02	5.08E-02	5.18E-02	8.68E-02	4.69E-02	4.26E-02	5.12E-02	4.73E-02
BA-137M	2.552 M	7.13E-01	6.82E-01	7.64E-01	8.81E-01	6.70E-01	6.04E-01	7.12E-01	6.56E-01
BA-139	83.1 M	3.99E-02	3.71E-02	3.99E-02	5.95E-02	3.64E-02	3.23E-02	3.88E-02	3.59E-02
BA-140	12.789 D	2.17E-01	2.06E-01	2.28E-01	2.82E-01	2.01E-01	1.80E-01	2.13E-01	1.97E-01

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/Y* PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
TE-131	25.0 M	7.65E-01	4.57E-01	4.61E-01	6.76E-01	5.25E-01	6.43E-01	4.09E-01	5.39E-01
TE-131M	30 H	2.70E 00	1.61E 00	1.64E 00	2.35E 00	1.85E 00	2.22E 00	1.45E 00	1.89E 00
TE-132	78.2 H	3.84E-01	2.21E-01	2.20E-01	3.40E-01	2.54E-01	3.22E-01	1.95E-01	2.66E-01
TE-133	12.45 M	1.72E 00	1.04E 00	1.05E 00	1.51E 00	1.18E 00	1.42E 00	9.42E-01	1.21E 00
TE-133M	55.4 M	4.23E 00	2.53E 00	2.57E 00	3.68E 00	2.91E 00	3.49E 00	2.29E 00	2.96E 00
TE-134	41.8 M	1.60E 00	9.44E-01	9.55E-01	1.40E 00	1.08E 00	1.32E 00	8.44E-01	1.11E 00
I-122	3.62 M	1.77E 00	1.05E 00	1.06E 00	1.55E 00	1.18E 00	1.43E 00	9.41E-01	1.23E 00
I-123	13.13 H	2.82E-01	1.59E-01	1.58E-01	2.50E-01	1.87E-01	2.40E-01	1.40E-01	1.95E-01
I-124	4.18 D	1.99E 00	1.19E 00	1.20E 00	1.73E 00	1.34E 00	1.61E 00	1.08E 00	1.39E 00
I-125	60.14 D	4.08E-02	4.11E-03	4.68E-03	2.14E-02	7.36E-03	1.37E-02	1.94E-03	1.40E-02
I-126	12.93 D	8.49E-01	4.98E-01	5.05E-01	7.36E-01	5.65E-01	6.88E-01	4.45E-01	5.87E-01
I-128	24.99 M	1.36E-01	8.02E-02	8.08E-02	1.19E-01	8.95E-02	1.10E-01	7.17E-02	9.44E-02
I-129	1.57E7 Y	2.64E-02	3.63E-03	4.08E-03	1.58E-02	7.06E-03	1.12E-02	2.21E-03	1.03E-02
I-130	12.36 H	3.98E 00	2.36E 00	2.40E 00	3.46E 00	2.68E 00	3.25E 00	2.11E 00	2.77E 00
I-131	8.040 D	6.78E-01	4.05E-01	4.07E-01	5.99E-01	4.53E-01	5.60E-01	3.62E-01	4.76E-01
I-132	2.30 H	4.33E 00	2.57E 00	2.62E 00	3.76E 00	2.95E 00	3.55E 00	2.32E 00	3.02E 00
I-133	20.8 H	1.11E 00	6.61E-01	6.69E-01	9.71E-01	7.45E-01	9.06E-01	5.93E-01	7.76E-01
I-134	52.6 M	5.01E 00	2.99E 00	3.05E 00	4.35E 00	3.45E 00	4.12E 00	2.71E 00	3.50E 00
I-135	6.61 H	3.01E 00	1.83E 00	1.85E 00	2.63E 00	2.09E 00	2.48E 00	1.68E 00	2.12E 00
I-136	83 S	4.99E 00	3.10E 00	3.16E 00	4.42E 00	3.51E 00	4.10E 00	2.87E 00	3.58E 00
XE-122	20.1 H	1.17E-01	5.89E-02	5.92E-02	9.67E-02	6.82E-02	8.75E-02	5.15E-02	7.48E-02
XE-123	2.14 H	1.15E 00	6.79E-01	6.85E-01	1.00E 00	7.74E-01	9.42E-01	6.13E-01	8.01E-01
XE-125	16.8 H	4.50E-01	2.56E-01	2.56E-01	3.94E-01	2.95E-01	3.72E-01	2.27E-01	3.09E-01
XE-127	36.406 D	4.65E-01	2.68E-01	2.67E-01	4.12E-01	3.08E-01	3.91E-01	2.38E-01	3.23E-01
XE-129M	8.89 D	6.08E-02	1.56E-02	1.63E-02	4.09E-02	2.25E-02	3.26E-02	1.21E-02	2.87E-02

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/Y PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
TE-131	25.0 M	4.87E-01	4.67E-01	5.02E-01	6.05E-01	5.00E-01	4.38E-01	4.00E-01	6.17E-01
TE-131M	30 H	1.75E 00	1.66E 00	1.77E 00	1.94E 00	1.79E 00	1.59E 00	1.43E 00	1.98E 00
TE-132	78.2 H	2.34E-01	2.23E-01	2.43E-01	3.32E-01	2.41E-01	1.97E-01	1.90E-01	3.39E-01
TE-133	12.45 M	1.12E 00	1.07E 00	1.14E 00	1.28E 00	1.16E 00	1.01E 00	9.23E-01	1.30E 00
TE-133M	55.4 M	2.75E 00	2.61E 00	2.78E 00	3.04E 00	2.82E 00	2.50E 00	2.25E 00	3.09E 00
TE-134	41.8 M	1.01E 00	9.67E-01	1.04E 00	1.22E 00	1.05E 00	9.19E-01	8.30E-01	1.24E 00
I-122	3.62 M	1.13E 00	1.08E 00	1.15E 00	1.32E 00	1.18E 00	1.03E 00	9.27E-01	1.34E 00
I-123	13.13 H	1.67E-01	1.60E-01	1.76E-01	2.55E-01	1.66E-01	1.41E-01	1.34E-01	2.61E-01
I-124	4.18 D	1.29E 00	1.23E 00	1.30E 00	1.43E 00	1.33E 00	1.16E 00	1.06E 00	1.45E 00
I-125	60.14 D	1.13E-02	4.75E-03	6.61E-03	1.10E-02	2.41E-03	4.70E-03	3.15E-03	1.15E-02
I-126	12.93 D	5.36E-01	5.11E-01	5.48E-01	6.22E-01	5.59E-01	4.91E-01	4.40E-01	6.32E-01
I-128	24.99 M	8.55E-02	8.19E-02	8.80E-02	1.03E-01	9.03E-02	7.80E-02	7.06E-02	1.05E-01
I-129	1.57E7 Y	9.15E-03	4.45E-03	5.56E-03	9.48E-03	2.11E-03	4.00E-03	2.66E-03	9.79E-03
I-130	12.36 H	2.54E 00	2.42E 00	2.59E 00	2.90E 00	2.65E 00	2.34E 00	2.09E 00	2.94E 00
I-131	8.040 D	4.29E-01	4.12E-01	4.44E-01	5.37E-01	4.57E-01	3.86E-01	3.56E-01	5.46E-01
I-132	2.30 H	2.79E 00	2.65E 00	2.83E 00	3.10E 00	2.88E 00	2.56E 00	2.29E 00	3.15E 00
I-133	20.8 H	7.10E-01	6.78E-01	7.27E-01	8.21E-01	7.41E-01	6.53E-01	5.84E-01	8.34E-01
I-134	52.6 M	3.25E 00	3.09E 00	3.29E 00	3.55E 00	3.34E 00	2.97E 00	2.67E 00	3.62E 00
I-135	6.61 H	2.00E 00	1.89E 00	2.00E 00	2.11E 00	2.02E 00	1.79E 00	1.64E 00	2.15E 00
I-136	83 S	3.43E 00	3.22E 00	3.38E 00	3.51E 00	3.44E 00	2.96E 00	2.81E 00	3.57E 00
XE-122	20.1 H	6.61E-02	6.01E-02	6.58E-02	8.56E-02	6.39E-02	5.54E-02	5.08E-02	8.74E-02
XE-123	2.14 H	7.32E-01	6.97E-01	7.47E-01	8.69E-01	7.68E-01	6.53E-01	5.99E-01	8.85E-01
XE-125	16.8 H	2.74E-01	2.59E-01	2.82E-01	3.72E-01	2.79E-01	2.34E-01	2.21E-01	3.80E-01
XE-127	36.406 D	2.84E-01	2.71E-01	2.95E-01	4.02E-01	2.92E-01	2.42E-01	2.31E-01	4.11E-01
XE-129M	8.89 D	2.52E-02	1.69E-02	1.97E-02	3.02E-02	1.40E-02	1.51E-02	1.26E-02	3.11E-02

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
LU-177	6.71 D	5.96E-02	3.49E-02	3.48E-02	5.43E-02	4.14E-02	5.26E-02	3.08E-02	4.24E-02
LU-177M	160.10 D	1.72E 00	1.01E 00	1.01E 00	1.54E 00	1.17E 00	1.46E 00	8.96E-01	1.21E 00
HF-181	42.39 D	9.68E-01	5.72E-01	6.75E-01	8.56E-01	6.47E-01	8.00E-01	5.10E-01	6.78E-01
TA-182	114.74 D	2.42E 00	1.44E 00	1.46E 00	2.11E 00	1.68E 00	2.01E 00	1.31E 00	1.69E 00
W-181	120.95 D	6.19E-02	2.59E-02	2.70E-02	5.41E-02	4.05E-02	5.21E-02	2.21E-02	3.94E-02
W-185	75.1 D	4.56E-05	2.74E-05	2.72E-05	4.28E-05	3.30E-05	4.25E-05	2.40E-05	3.33E-05
W-187	23.83 H	8.75E-01	5.13E-01	5.21E-01	7.64E-01	5.89E-01	7.18E-01	4.58E-01	6.08E-01
W-188	69.4 D	3.05E-03	1.83E-03	1.82E-03	2.74E-03	2.08E-03	2.60E-03	1.63E-03	2.16E-03
RE-182	64.0 H	3.20E 00	1.90E 00	1.92E 00	2.81E 00	2.22E 00	2.68E 00	1.72E 00	2.25E 00
RE-182M	12.7 H	2.24E 00	1.32E 00	1.34E 00	1.95E 00	1.55E 00	1.86E 00	1.20E 00	1.56E 00
RE-183	70 D	2.53E-01	1.30E-01	1.32E-01	2.27E-01	1.72E-01	2.20E-01	1.14E-01	1.72E-01
RE-184	38.0 D	1.68E 00	9.83E-01	1.00E 00	1.46E 00	1.15E 00	1.39E 00	8.80E-01	1.17E 00
RE-184M	169 D	7.01E-01	4.05E-01	4.10E-01	6.17E-01	4.81E-01	5.90E-01	3.61E-01	4.88E-01
RE-186	90.64 H	3.46E-02	1.93E-02	1.94E-02	3.18E-02	2.45E-02	3.13E-02	1.69E-02	2.44E-02
RE-187	4.7E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RE-188	16.98 H	1.04E-01	6.19E-02	6.23E-02	9.30E-02	7.24E-02	8.95E-02	5.52E-02	7.37E-02
OS-185	93.6 D	1.31E 00	7.64E-01	7.78E-01	1.14E 00	8.85E-01	1.07E 00	6.83E-01	9.07E-01
OS-186	2.0E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OS-190M	9.9 M	2.87E 00	1.70E 00	1.72E 00	2.52E 00	1.92E 00	2.36E 00	1.52E 00	2.01E 00
OS-191	15.4 D	1.20E-01	6.34E-02	6.40E-02	1.09E-01	8.43E-02	1.08E-01	5.54E-02	8.30E-02
OS-191M	13.03 H	8.04E-03	3.37E-03	3.49E-03	6.66E-03	5.09E-03	6.49E-03	2.92E-03	4.93E-03
OS-193	30.0 H	1.18E-01	6.82E-02	6.87E-02	1.05E-01	7.98E-02	9.92E-02	6.07E-02	8.24E-02
IR-190	11.78 D	2.53E 00	1.49E 00	1.51E 00	2.22E 00	1.70E 00	2.09E 00	1.34E 00	1.77E 00
IR-190M	1.2 H	7.34E-04	9.93E-07	8.98E-07	3.19E-05	3.69E-09	2.21E-06	9.54E-10	4.40E-05
IR-190M	3.2 H	7.66E-02	3.48E-02	3.60E-02	6.85E-02	5.25E-02	6.70E-02	3.02E-02	5.05E-02

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
LU-177	6.71 D	3.67E-02	3.54E-02	3.87E-02	5.63E-02	3.62E-02	3.08E-02	2.93E-02	5.76E-02
LU-177M	160.10 D	1.07E 00	1.03E 00	1.11E 00	1.50E 00	1.09E 00	9.24E-01	8.64E-01	1.53E 00
HF-181	42.39 D	6.08E-01	5.84E-01	6.30E-01	7.75E-01	6.30E-01	5.49E-01	4.97E-01	7.89E-01
TA-182	114.74 D	1.57E 00	1.49E 00	1.59E 00	1.75E 00	1.58E 00	1.42E 00	1.28E 00	1.78E 00
W-181	120.95 D	3.29E-02	2.96E-02	3.28E-02	5.89E-02	1.78E-02	2.40E-02	1.84E-02	6.04E-02
W-185	75.1 D	2.79E-05	2.75E-05	3.04E-05	4.77E-05	2.66E-05	2.37E-05	2.24E-05	4.91E-05
W-187	23.83 H	5.53E-01	5.28E-01	5.67E-01	6.59E-01	5.66E-01	5.06E-01	4.50E-01	6.70E-01
W-188	69.4 D	1.92E-03	1.85E-03	2.01E-03	2.64E-03	2.03E-03	1.67E-03	1.58E-03	2.70E-03
RE-182	64.0 H	2.06E 00	1.96E 00	2.09E 00	2.44E 00	2.05E 00	1.83E 00	1.67E 00	2.49E 00
RE-182M	12.7 H	1.45E 00	1.37E 00	1.46E 00	1.63E 00	1.44E 00	1.30E 00	1.17E 00	1.66E 00
RE-183	70 D	1.46E-01	1.38E-01	1.52E-01	2.42E-01	1.18E-01	1.17E-01	1.03E-01	2.48E-01
RE-184	38.0 D	1.07E 00	1.02E 00	1.09E 00	1.22E 00	1.08E 00	9.78E-01	8.66E-01	1.25E 00
RE-184M	169 D	4.39E-01	4.18E-01	4.51E-01	5.60E-01	4.32E-01	3.89E-01	3.50E-01	5.71E-01
RE-186	90.64 H	2.06E-02	1.99E-02	2.20E-02	3.49E-02	1.81E-02	1.70E-02	1.55E-02	3.58E-02
RE-187	4.7E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RE-188	16.98 H	6.57E-02	6.32E-02	6.83E-02	8.75E-02	6.62E-02	5.83E-02	5.34E-02	8.93E-02
OS-185	93.6 D	8.29E-01	7.89E-01	8.46E-01	9.67E-01	8.43E-01	7.59E-01	6.71E-01	9.83E-01
OS-186	2.0E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OS-190M	9.9 M	1.82E 00	1.74E 00	1.87E 00	2.21E 00	1.91E 00	1.65E 00	1.50E 00	2.25E 00
OS-191	15.4 D	6.94E-02	6.67E-02	7.36E-02	1.22E-01	5.49E-02	5.61E-02	4.93E-02	1.26E-01
OS-191M	13.03 H	4.06E-03	3.78E-03	4.17E-03	7.44E-03	2.41E-03	3.08E-03	2.43E-03	7.64E-03
OS-193	30.0 H	7.30E-02	7.01E-02	7.59E-02	9.94E-02	7.25E-02	6.44E-02	5.82E-02	1.01E-01
IR-190	11.78 D	1.60E 00	1.53E 00	1.65E 00	1.96E 00	1.66E 00	1.45E 00	1.31E 00	1.99E 00
IR-190M	1.2 H	1.08E-08	4.47E-08	3.48E-06	2.09E-06	1.14E-06	1.72E-06	2.57E-06	5.65E-06
IR-190M	3.2 H	4.20E-02	3.90E-02	4.31E-02	7.68E-02	2.48E-02	3.17E-02	2.50E-02	7.88E-02

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
LU-177	6.71 D	3.81E-02	3.56E-02	3.76E-02	5.95E-02	3.42E-02	3.04E-02	3.65E-02	3.39E-02
LU-177M	160.10 D	1.10E 00	1.03E 00	1.11E 00	1.60E 00	9.97E-01	8.92E-01	1.06E 00	9.85E-01
HF-181	42.39 D	6.21E-01	5.87E-01	6.47E-01	8.30E-01	5.72E-01	5.12E-01	6.08E-01	5.61E-01
TA-182	114.74 D	1.52E 00	1.50E 00	1.68E 00	1.94E 00	1.47E 00	1.35E 00	1.57E 00	1.44E 00
W-181	120.95 D	2.65E-02	3.05E-02	2.78E-02	6.69E-02	2.46E-02	2.28E-02	2.71E-02	2.39E-02
W-185	75.1 D	2.96E-05	2.75E-05	2.94E-05	4.87E-05	2.71E-05	2.34E-05	2.91E-05	2.64E-05
W-187	23.83 H	5.54E-01	5.31E-01	5.90E-01	7.14E-01	5.19E-01	4.67E-01	5.51E-01	5.07E-01
W-188	69.4 D	2.02E-03	1.86E-03	2.00E-03	2.01E-03	1.81E-03	1.62E-03	1.91E-03	1.79E-03
RE-182	64.0 H	2.01E 00	1.97E 00	2.17E 00	2.68E 00	1.92E 00	1.75E 00	2.05E 00	1.89E 00
RE-182M	12.7 H	1.39E 00	1.38E 00	1.54E 00	1.81E 00	1.35E 00	1.24E 00	1.44E 00	1.32E 00
RE-183	70 D	1.39E-01	1.40E-01	1.40E-01	2.62E-01	1.27E-01	1.14E-01	1.37E-01	1.24E-01
RE-184	38.0 D	1.05E 00	1.02E 00	1.14E 00	1.34E 00	1.00E 00	9.08E-01	1.07E 00	9.80E-01
RE-184M	169 D	4.35E-01	4.21E-01	4.60E-01	6.08E-01	4.08E-01	3.68E-01	4.34E-01	4.00E-01
RE-186	90.64 H	2.07E-02	2.01E-02	2.08E-02	3.65E-02	1.90E-02	1.67E-02	2.04E-02	1.85E-02
RE-187	4.7E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RE-188	16.98 H	6.68E-02	6.35E-02	6.96E-02	9.32E-02	6.22E-02	5.56E-02	6.62E-02	6.09E-02
OS-185	93.6 D	8.23E-01	7.95E-01	8.84E-01	1.05E 00	7.75E-01	7.00E-01	8.25E-01	7.58E-01
OS-186	2.0E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OS-190M	9.9 M	1.85E 00	1.75E 00	1.94E 00	2.38E 00	1.71E 00	1.54E 00	1.82E 00	1.68E 00
OS-191	15.4 D	6.69E-02	6.73E-02	6.84E-02	1.29E-01	6.21E-02	5.49E-02	6.67E-02	6.00E-02
OS-191M	13.03 H	3.45E-03	3.85E-03	3.66E-03	8.39E-03	3.25E-03	2.96E-03	3.51E-03	3.12E-03
OS-193	30.0 H	7.38E-02	7.06E-02	7.64E-02	1.06E-01	6.79E-02	6.08E-02	7.22E-02	6.65E-02
IR-190	11.78 D	1.62E 00	1.54E 00	1.70E 00	2.11E 00	1.50E 00	1.35E 00	1.60E 00	1.47E 00
IR-190M	1.2 H	4.40E-06	3.05E-09	3.52E-07	3.44E-04	5.74E-07	8.68E-09	1.42E-08	1.81E-06
IR-190M	3.2 H	3.56E-02	3.98E-02	3.78E-02	8.36E-02	3.35E-02	3.06E-02	3.63E-02	3.21E-02

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
SM-151	90 Y	6.22E-06	1.79E-07	2.04E-07	1.62E-06	1.45E-07	6.68E-07	1.87E-08	1.18E-06
SM-153	46.7 H	9.55E-02	4.34E-02	4.43E-02	8.33E-02	6.12E-02	7.93E-02	3.73E-02	6.17E-02
EU-152	13.6 Y	2.14E 00	1.27E 00	1.29E 00	1.86E 00	1.47E 00	1.77E 00	1.15E 00	1.49E 00
EU-152M	9.32 H	5.94E-01	3.48E-01	3.55E-01	5.14E-01	4.07E-01	4.89E-01	3.13E-01	4.12E-01
EU-154	8.8 Y	2.36E 00	1.41E 00	1.43E 00	2.05E 00	1.63E 00	1.95E 00	1.27E 00	1.65E 00
EU-155	4.96 Y	9.94E-02	5.14E-02	5.20E-02	9.08E-02	6.92E-02	8.92E-02	4.46E-02	6.86E-02
EU-156	15.19 D	2.64E 00	1.61E 00	1.64E 00	2.31E 00	1.83E 00	2.17E 00	1.48E 00	1.87E 00
GD-152	1.1E14 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GD-153	241.6 D	1.68E-01	7.34E-02	7.52E-02	1.45E-01	1.06E-01	1.38E-01	6.27E-02	1.07E-01
GD-159	18.56 H	6.85E-02	3.78E-02	3.81E-02	5.98E-02	4.45E-02	5.55E-02	3.36E-02	4.66E-02
GD-162	9.7 M	7.55E-01	4.49E-01	4.51E-01	6.64E-01	5.00E-01	6.16E-01	4.01E-01	5.28E-01
TB-157	150 Y	5.92E-03	1.62E-03	1.75E-03	4.50E-03	3.03E-03	3.95E-03	1.33E-03	3.10E-03
TB-160	72.3 D	2.04E 00	1.21E 00	1.23E 00	1.77E 00	1.41E 00	1.69E 00	1.10E 00	1.42E 00
TB-162	7.76 M	2.05E 00	1.22E 00	1.24E 00	1.79E 00	1.41E 00	1.70E 00	1.09E 00	1.43E 00
DY-157	8.06 H	6.04E-01	3.47E-01	3.48E-01	5.32E-01	3.99E-01	4.97E-01	3.09E-01	4.18E-01
DY-165	2.334 H	4.50E-02	2.49E-02	2.52E-02	3.94E-02	3.00E-02	3.71E-02	2.20E-02	3.08E-02
DY-166	81.6 H	6.11E-02	2.59E-02	2.68E-02	5.25E-02	3.84E-02	4.94E-02	2.22E-02	3.85E-02
HO-166	26.80 H	5.13E-02	2.86E-02	2.90E-02	4.49E-02	3.51E-02	4.27E-02	2.59E-02	3.53E-02
HO-166M	1.2E03 Y	2.96E 00	1.75E 00	1.78E 00	2.59E 00	2.02E 00	2.45E 00	1.57E 00	2.07E 00
ER-169	9.40 D	6.86E-06	1.60E-06	1.60E-06	2.74E-06	1.98E-06	2.56E-06	1.39E-06	2.23E-06
ER-171	7.52 H	6.47E-01	3.81E-01	3.81E-01	5.78E-01	4.37E-01	5.47E-01	3.38E-01	4.55E-01
TM-170	128.6 D	8.43E-03	3.92E-03	4.02E-03	7.52E-03	5.68E-03	7.32E-03	3.37E-03	5.57E-03
TM-171	1.92 Y	1.03E-03	4.03E-04	4.22E-04	8.81E-04	6.44E-04	8.35E-04	3.38E-04	6.36E-04
YB-169	31.97 D	5.10E-01	2.66E-01	2.68E-01	4.55E-01	3.41E-01	4.36E-01	2.32E-01	3.47E-01
YB-175	4.19 D	6.91E-02	4.08E-02	4.09E-02	6.14E-02	4.63E-02	5.77E-02	3.63E-02	4.85E-02

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
SM-151	90 Y	3.92E-07	1.32E-07	3.40E-07	4.95E-07	1.16E-07	2.23E-07	1.77E-07	5.67E-07
SM-153	46.7 H	5.31E-02	4.66E-02	5.17E-02	8.69E-02	3.64E-02	3.93E-02	3.35E-02	8.92E-02
EU-152	13.6 Y	1.39E 00	1.31E 00	1.40E 00	1.94E 00	1.40E 00	1.25E 00	1.13E 00	1.57E 00
EU-152M	9.32 H	3.81E-01	3.60E-01	3.84E-01	4.24E-01	5.85E-01	3.47E-01	3.09E-01	4.31E-01
EU-154	8.8 Y	1.53E 00	1.45E 00	1.55E 00	1.69E 00	1.55E 00	1.39E 00	1.25E 00	1.72E 00
EU-155	4.96 Y	5.74E-02	5.41E-02	6.00E-02	1.01E-01	4.36E-02	4.56E-02	[illegible].98E-02	1.04E-01
EU-156	15.19 D	1.77E 00	1.67E 00	1.76E 00	1.86E 00	1.78E 00	1.56E 00	1.45E 00	1.89E 00
GD-152	1.1E14 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GD-153	241.6 D	9.24E-02	7.95E-02	8.84E-02	1.50E-01	5.99E-02	6.67E-02	5.61E-02	1.54E-01
GD-159	18.56 H	4.18E-02	3.91E-02	4.23E-02	5.45E-02	4.09E-02	3.59E-02	3.25E-02	5.55E-02
GD-162	9.7 M	4.77E-01	4.58E-01	4.92E-01	5.85E-01	5.06E-01	4.33E-01	3.94E-01	5.95E-01
TB-157	150 Y	2.82E-03	2.00E-03	2.22E-03	3.99E-03	9.85E-04	1.61E-03	1.12E-03	4.08E-03
TB-160	72.3 D	1.32E 00	1.25E 00	1.33E 00	1.46E 00	1.34E 00	1.20E 00	1.08E 00	1.49E 00
TB-162	7.76 M	1.31E 00	1.25E 00	1.34E 00	1.52E 00	1.36E 00	1.19E 00	1.08E 00	1.55E 00
DY-157	8.06 H	3.74E-01	3.55E-01	3.84E-01	4.92E-01	3.83E-01	3.25E-01	3.01E-01	5.01E-01
DY-165	2.334 H	2.75E-02	2.58E-02	2.80E-02	3.59E-02	2.60E-02	2.40E-02	2.12E-02	3.67E-02
DY-166	81.6 H	3.30E-02	2.89E-02	3.19E-02	5.36E-02	2.04E-02	2.42E-02	1.95E-02	5.50E-02
HO-166	26.80 H	3.22E-02	3.01E-02	3.22E-02	4.00E-02	2.90E-02	2.74E-02	2.45E-02	4.08E-02
HO-166M	1.20E3 Y	1.89E 00	1.80E 00	1.93E 00	2.22E 00	1.95E 00	1.72E 00	1.55E 00	2.26E 00
ER-169	9.40 D	1.65E-06	1.62E-06	1.81E-06	2.91E-06	1.50E-06	1.40E-06	1.30E-06	3.02E-06
ER-171	7.52 H	4.03E-01	3.87E-01	4.20E-01	5.51E-01	4.16E-01	3.52E-01	3.28E-01	5.62E-01
TM-170	128.6 D	4.63E-03	4.29E-03	4.76E-03	8.33E-03	2.98E-03	3.55E-03	2.90E-03	8.56E-03
TM-171	1.92 Y	5.32E-04	4.65E-04	5.18E-04	9.32E-04	2.69E-04	3.77E-04	2.84E-04	9.56E-04
YB-169	31.97 D	2.98E-01	2.79E-01	3.06E-01	4.71E-01	2.53E-01	2.39E-01	2.15E-01	4.82E-01
YB-175	4.19 D	4.32E-02	4.15E-02	4.49E-02	5.71E-02	4.49E-02	3.83E-02	3.53E-02	5.82E-02

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
SM-151	90 Y	2.89E-07	1.55E-07	8.75E-08	4.25E-06	1.03E-07	7.84E-08	2.56E-07	2.05E-07
SM-153	46.7 H	4.61E-02	4.90E-02	4.54E-02	1.01E-01	4.16E-02	3.76E-02	4.73E-02	4.12E-02
EU-152	13.6 Y	1.35E 00	1.32E 00	1.47E 00	1.72E 00	1.30E 00	1.18E 00	1.38E 00	1.27E 00
EU-152M	9.32 H	3.72E-01	3.63E-01	4.05E-01	4.71E-01	3.56E-01	3.24E-01	3.80E-01	3.49E-01
EU-154	8.8 Y	1.49E 00	1.46E 00	1.64E 00	1.87E 00	1.44E 00	1.31E 00	1.53E 00	1.41E 00
EU-155	4.96 Y	5.43E-02	5.52E-02	5.50E-02	1.08E-01	5.02E-02	4.43E-02	5.50E-02	4.87E-02
EU-156	15.19 D	1.66E 00	1.67E 00	1.87E 00	2.10E 00	1.66E 00	1.53E 00	1.76E 00	1.62E 00
GD-152	1.1E14 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GD-153	241.6 D	7.79E-02	8.43E-02	7.61E-02	1.79E-01	6.97E-02	6.35E-02	8.04E-02	6.94E-02
GD-159	18.56 H	4.13E-02	3.98E-02	4.19E-02	6.09E-02	3.72E-02	3.38E-02	4.00E-02	3.70E-02
GD-162	9.7 M	4.90E-01	4.60E-01	5.08E-01	6.31E-01	4.49E-01	4.03E-01	4.76E-01	4.42E-01
TB-157	150 Y	1.70E-03	2.32E-03	1.54E-03	5.95E-03	1.39E-03	1.45E-03	1.85E-03	1.49E-03
TB-160	72.3 D	1.29E 00	1.26E 00	1.41E 00	1.62E 00	1.24E 00	1.13E 00	1.32E 00	1.2[illegible]E 00
TB-162	7.76 M	1.31E 00	1.26E 00	1.40E 00	1.66E 00	1.24E 00	1.12E 00	1.32E 00	1.21E 00
DY-157	8.06 H	3.81E-01	3.59E-01	3.83E-01	5.38E-01	3.42E-01	3.09E-01	3.66E-01	3.40E-01
DY-165	2.334 H	2.68E-02	2.62E-02	2.80E-02	3.97E-02	2.48E-02	2.24E-02	2.67E-02	2.43E-02
DY-166	81.6 H	2.71E-02	3.02E-02	2.75E-02	6.34E-02	2.46E-02	2.28E-02	2.77E-02	2.43E-02
HO-166	26.80 H	2.95E-02	3.04E-02	3.27E-02	4.51E-02	2.89E-02	2.66E-02	3.10E-02	2.83E-02
HO-166M	1.20E3 Y	1.90E 00	1.81E 00	2.02E 00	2.41E 00	1.78E 00	1.61E 00	1.89E 00	1.74E 00
ER-169	9.40 D	1.74E-06	1.62E-06	1.72E-06	4.90E-06	1.58E-06	1.36E-06	1.71E-06	1.54E-06
ER-171	7.52 H	4.17E-01	3.90E-01	4.20E-01	5.90E-01	3.77E-01	3.38E-01	4.00E-01	3.73E-01
TM-170	128.6 D	4.06E-03	4.38E-03	4.21E-03	9.15E-03	3.79E-03	3.41E-03	4.13E-03	3.66E-03
TM-171	1.92 Y	4.13E-04	4.84E-04	4.26E-04	1.10E-03	3.78E-04	3.55E-04	4.23E-04	3.71E-04
YB-169	31.97 D	2.86E-01	2.83E-01	2.85E-01	5.18E-01	2.58E-01	2.33E-01	2.79E-01	2.55E-01
YB-175	4.19 D	4.45E-02	4.18E-02	4.55E-02	6.12E-02	4.05E-02	3.63E-02	4.30E-02	3.99E-02

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
BA-141	18.27 M	1.64E 00	9.86E-01	9.94E-01	1.44E 00	1.12E 00	1.36E 00	8.91E-01	1.15E 00
BA-142	10.70 M	1.69E 00	1.01E 00	1.02E 00	1.47E 00	1.17E 00	1.40E 00	9.13E-01	1.18E 00
LA-140	40.22 H	4.42E 00	2.69E 00	2.73E 00	3.87E 00	3.06E 00	3.62E 00	2.49E 00	3.13E 00
LA-141	3.94 H	8.04E-02	4.89E-02	4.94E-02	7.01E-02	5.60E-02	6.62E-02	4.52E-02	5.68E-02
LA-142	95.4 M	5.53E 00	3.45E 00	3.54E 00	4.92E 00	3.87E 00	4.52E 00	3.22E 00	3.99E 00
CE-139	137.66 D	2.62E-01	1.44E-01	1.45E-01	2.34E-01	1.74E-01	2.24E-01	1.28E-01	1.81E-01
CE-141	32.50 D	1.30E-01	7.58E-02	7.53E-02	1.19E-01	9.08E-02	1.16E-01	6.66E-02	9.25E-02
CE-143	33.0 H	4.77E-01	2.72E-01	2.75E-01	4.16E-01	3.15E-01	3.89E-01	2.42E-01	3.28E-01
CE-144	284.3 D	3.15E-02	1.72E-02	1.72E-02	2.85E-02	2.14E-02	2.77E-02	1.50E-02	2.18E-02
PR-142	19.13 H	1.11E-01	6.83E-02	6.90E-02	9.74E-02	7.76E-02	9.15E-02	6.36E-02	7.91E-02
PR-143	13.56 D	1.69E-08	9.98E-09	1.02E-08	1.46E-08	1.15E-08	1.38E-08	8.93E-09	1.17E-08
PR-144	17.28 M	6.39E-02	3.92E-02	4.00E-02	5.62E-02	4.42E-02	5.21E-02	3.65E-02	4.55E-02
PR-144M	7.2 M	1.40E-02	2.77E-03	3.07E-03	9.73E-03	5.66E-03	7.78E-03	2.10E-03	6.45E-03
ND-147	10.98 D	2.43E-01	1.34E-01	1.36E-01	2.12E-01	1.59E-01	1.98E-01	1.19E-01	1.65E-01
ND-149	1.73 H	6.73E-01	3.96E-01	3.98E-01	5.97E-01	4.54E-01	5.65E-01	3.53E-01	4.72E-01
PM-143	265 D	5.75E-01	3.26E-01	3.33E-01	4.92E-01	3.82E-01	4.63E-01	2.91E-01	3.92E-01
PM-144	363 D	2.87E 00	1.69E 00	1.71E 00	2.49E 00	1.92E 00	2.33E 00	1.51E 00	1.99E 00
PM-145	17.7 Y	4.07E-02	9.70E-03	1.06E-02	2.98E-02	1.87E-02	2.50E-02	7.74E-03	2.02E-02
PM-146	2020 D	1.38E 00	8.12E-01	8.24E-01	1.20E 00	9.26E-01	1.13E 00	7.26E-01	9.59E-01
PM-147	2.6234 Y	5.97E-06	3.57E-06	3.55E-06	5.61E-06	4.33E-06	5.58E-06	3.12E-06	4.36E-06
PM-148	5.37 D	1.08E 00	6.49E-01	6.57E-01	9.38E-01	7.42E-01	8.84E-01	5.93E-01	7.57E-01
PM-148M	41.3 D	3.70E 00	2.19E 00	2.22E 00	3.22E 00	2.49E 00	3.02E 00	1.96E 00	2.58E 00
PM-149	53.08 H	2.06E-02	1.23E-02	1.24E-02	1.83E-02	1.39E-02	1.72E-02	1.10E-02	1.45E-02
PM-151	28.40 H	5.97E-01	3.51E-01	3.53E-01	5.27E-01	4.02E-01	4.97E-01	3.13E-01	4.17E-01
SM-147	1.06E11 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/CUBIC CM

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
PO-216	0.146 S	1.76E-05	1.70E-05	1.91E-05	2.15E-05	1.67E-05	1.51E-05	1.78E-05	1.64E-05
PO-218	3.05 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AT-211	7.214 H	3.49E-02	3.59E-02	3.67E-02	6.90E-02	3.31E-02	2.92E-02	3.53E-02	3.16E-02
AT-217	0.0323 S	2.81E-04	2.68E-04	3.00E-04	3.50E-04	2.63E-04	2.37E-04	2.79E-04	2.58E-04
RN-218	0.035 S	8.97E-04	8.56E-04	9.58E-04	1.11E-03	8.39E-04	7.56E-04	8.92E-04	8.21E-04
RN-219	3.96 S	6.63E-02	6.15E-02	6.71E-02	8.90E-02	5.99E-02	5.37E-02	6.34E-02	5.92E-02
RN-220	55.61 S	6.13E-04	5.83E-04	6.51E-04	7.67E-04	5.71E-04	5.14E-04	6.06E-04	5.59E-04
RN-222	3.8235 D	4.53E-04	4.30E-04	4.80E-04	5.71E-04	4.21E-04	3.78E-04	4.46E-04	4.12E-04
FR-221	4.8 M	3.51E-02	3.22E-02	3.44E-02	5.11E-02	3.13E-02	2.80E-02	3.32E-02	3.11E-02
FR-223	21.8 M	4.56E-02	4.59E-02	4.65E-02	6.35E-02	4.17E-02	3.76E-02	4.51E-02	4.10E-02
RA-222	38.0 S	1.07E-02	9.86E-03	1.08E-02	1.42E-02	9.62E-03	8.63E-03	1.02E-02	9.52E-03
RA-223	11.434 D	1.49E-01	1.38E-01	1.47E-01	2.25E-01	1.33E-01	1.18E-01	1.41E-01	1.30E-01
RA-224	3.62 D	1.15E-02	1.04E-02	1.14E-02	1.63E-02	1.03E-02	9.20E-03	1.09E-02	1.02E-02
RA-225	14.8 D	4.08E-03	5.98E-03	3.36E-03	1.66E-02	3.10E-03	3.42E-03	4.60E-03	3.53E-03
RA-226	1600 Y	7.61E-03	6.99E-03	7.45E-03	1.15E-02	6.81E-03	6.04E-03	7.23E-03	6.74E-03
RA-228	5.75 Y	6.22E-12	1.12E-18	4.96E-13	4.87E-10	8.10E-13	1.05E-14	1.54E-14	2.55E-12
AC-225	10.0 D	1.40E-02	1.34E-02	1.41E-02	2.44E-02	1.29E-02	1.13E-02	1.38E-02	1.25E-02
AC-227	21.773 Y	1.25E-04	1.17E-04	1.24E-04	2.53E-04	1.15E-04	9.90E-05	1.23E-04	1.12E-04
AC-228	6.13 H	1.11E 00	1.00E 00	1.21E 00	1.39E 00	1.07E 00	9.73E-01	1.14E 00	1.05E 00
TH-226	30.9 M	8.39E-03	7.86E-03	8.35E-03	1.38E-02	7.64E-03	6.69E-03	8.18E-03	7.47E-03
TH-227	18.718 D	1.17E-01	1.09E-01	1.17E-01	1.70E-01	1.05E-01	9.42E-02	1.12E-01	1.04E-01
TH-228	1.9132 Y	2.00E-03	1.92E-03	2.01E-03	3.71E-03	1.83E-03	1.61E-03	1.95E-03	1.78E-03
TH-229	7.34E3 Y	8.76E-02	8.46E-02	8.83E-02	1.57E-01	8.07E-02	7.07E-02	8.66E-02	7.83E-02
TH-230	7.7E4 Y	3.43E-04	3.44E-04	3.49E-04	9.12E-04	3.14E-04	2.81E-04	3.35E-04	3.06E-04
TH-231	25.52 H	1.05E-02	1.05E-02	1.06E-02	2.48E-02	9.65E-03	8.45E-03	1.06E-02	9.37E-03

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/CUBIC CM

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
TL-209	2.20 M	3.96E 00	2.41E 00	2.43E 00	3.48E 00	2.74E 00	3.27E 00	2.22E 00	2.81E 00
TL-210	1.30 M	5.34E 00	3.24E 00	3.30E 00	4.68E 00	3.70E 00	4.39E 00	2.97E 00	3.78E 00
PB-203	52.02 H	5.22E-01	3.03E-01	3.04E-01	4.69E-01	3.58E-01	4.48E-01	2.70E-01	3.67E-01
PB-204M	66.9 M	3.95E 00	2.35E 00	2.39E 00	3.43E 00	2.71E 00	3.26E 00	2.11E 00	2.75E 00
PB-205	1.51E7 Y	9.03E-04	1.39E-06	1.27E-06	4.24E-05	1.51E-09	3.19E-06	3.97E-10	5.70E-05
PB-209	3.253 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB-210	22.26 Y	3.78E-03	8.43E-04	9.04E-04	2.25E-03	1.51E-03	1.97E-03	6.93E-04	1.60E-03
PB-211	36.1 M	9.46E-02	5.61E-02	5.69E-02	8.24E-02	6.40E-02	7.76E-02	5.03E-02	6.59E-02
PB-212	10.643 H	2.53E-01	1.49E-01	1.49E-01	2.29E-01	1.77E-01	2.21E-01	1.33E-01	1.80E-01
PB-214	26.8 M	4.37E-01	2.40E-01	2.61E-01	3.09E-01	2.95E-01	3.67E-01	2.32E-01	3.08E-01
BI-206	6.243 D	6.20E 00	3.70E 00	3.76E 00	5.41E 00	4.26E 00	5.11E 00	3.36E 00	4.34E 00
BI-207	33.4 Y	2.89E 00	1.72E 00	1.74E 00	2.51E 00	1.98E 00	2.38E 00	1.55E 00	2.02E 00
BI-208	3.68E5 Y	5.58E 00	3.55E 00	3.66E 00	5.02E 00	3.95E 00	4.55E 00	3.34E 00	4.08E 00
BI-210	5.013 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BI-211	2.13 M	8.34E-02	4.98E-02	4.99E-02	7.41E-02	5.59E-02	6.94E-02	4.45E-02	5.87E-02
BI-212	60.55 M	3.49E-01	2.09E-01	2.12E-01	3.03E-01	2.39E-01	2.86E-01	1.90E-01	2.44E-01
BI-213	45.65 M	2.30E-01	1.48E-01	1.49E-01	2.20E-01	1.66E-01	2.04E-01	1.33E-01	1.75E-01
BI-214	19.9 M	2.92E 00	1.78E 00	1.80E 00	2.55E 00	2.02E 00	2.39E 00	1.64E 00	2.07E 00
PO-209	102 Y	6.41E-03	3.79E-03	3.85E-03	5.62E-03	4.42E-03	5.37E-03	3.40E-03	4.48E-03
PO-210	138.378 D	1.62E-05	9.61E-06	9.80E-06	1.40E-05	1.11E-05	1.33E-05	8.61E-06	1.13E-05
PO-211	0.516 S	1.47E-02	8.69E-03	8.84E-03	1.27E-02	9.97E-03	1.20E-02	7.79E-03	1.02E-02
PO-212	2.98E-7 S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PO-213	4.2E-6 S	5.80E-05	3.43E-05	3.50E-05	5.02E-05	3.96E-05	4.76E-05	3.07E-05	4.03E-05
PO-214	1.637E-4 S	1.59E-04	9.41E-05	9.59E-05	1.37E-04	1.09E-04	1.30E-04	8.43E-05	1.10E-04
PO-215	1.778E-3 S	2.67E-04	1.59E-04	1.60E-04	2.35E-04	1.77E-04	2.17E-04	1.42E-04	1.87E-04

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IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
TL-209	2.20 M	2.62E 00	2.49E 00	2.64E 00	2.88E 00	2.65E 00	2.33E 00	2.15E 00	2.93E 00
TL-210	1.30 M	3.55E 00	3.36E 00	3.56E 00	3.83E 00	3.61E 00	3.15E 00	2.91E 00	3.89E 00
PB-203	52.02 H	3.22E-01	3.11E-01	3.37E-01	4.65E-01	3.20E-01	2.77E-01	2.57E-01	4.75E-01
PB-204M	66.9 M	2.54E 00	2.42E 00	2.58E 00	2.84E 00	2.62E 00	2.33E 00	2.09E 00	2.89E 00
PB-205	1.51E7 Y	9.66E-09	6.81E-08	4.74E-06	3.01E-06	1.56E-06	2.35E-06	3.45E-06	7.69E-06
PB-209	3.253 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB-210	22.26 Y	1.36E-03	1.02E-03	1.14E-03	2.06E-03	5.20E-04	8.28E-04	5.84E-04	2.11E-03
PB-211	36.1 M	6.04E-02	5.76E-02	6.17E-02	6.97E-02	6.29E-02	5.54E-02	4.97E-02	7.09E-02
PB-212	10.643 H	1.57E-01	1.52E-01	1.65E-01	2.32E-01	1.58E-01	1.34E-01	1.26E-01	2.37E-01
PB-214	26.8 M	2.75E-01	2.65E-01	2.86E-01	3.63E-01	2.88E-01	2.43E-01	2.26E-01	3.70E-01
BI-206	6.243 D	4.02E 00	3.83E 00	4.08E 00	4.49E 00	4.11E 00	3.65E 00	3.29E 00	4.57E 00
BI-207	33.4 Y	1.86E 00	1.77E 00	1.89E 00	2.09E 00	1.90E 00	1.70E 00	1.52E 00	2.13E 00
BI-208	3.68E5 Y	3.99E 00	3.71E 00	3.87E 00	3.97E 00	3.95E 00	3.28E 00	3.25E 00	4.04E 00
BI-210	5.013 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BI-211	2.13 M	5.25E-02	5.06E-02	5.46E-02	6.82E-02	5.57E-02	4.68E-02	4.34E-02	6.94E-02
BI-212	60.55 M	2.27E-01	2.16E-01	2.29E-01	2.47E-01	2.33E-01	2.06E-01	1.86E-01	2.51E-01
BI-213	45.65 M	1.58E-01	1.52E-01	1.63E-01	1.93E-01	1.66E-01	1.44E-01	1.30E-01	1.96E-01
BI-214	19.9 M	1.94E 00	1.84E 00	1.95E 00	2.06E 00	1.97E 00	1.73E 00	1.60E 00	2.10E 00
PO-209	102 Y	4.09E-03	3.90E-03	4.18E-03	4.92E-03	4.16E-03	3.68E-03	3.33E-03	5.01E-03
PO-210	138.378 D	1.04E-05	9.90E-06	1.06E-05	1.15E-05	1.07E-05	9.63E-06	8.54E-06	1.17E-05
PO-211	0.516 S	9.40E-03	8.95E-03	9.56E-03	1.05E-02	9.72E-03	8.67E-03	7.72E-03	1.07E-02
PO-212	2.98E-7 S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PO-213	4.2E-6 S	3.72E-05	3.54E-05	3.78E-05	4.13E-05	3.84E-05	3.44E-05	3.05E-05	4.19E-05
PO-214	1.637E-4 S	1.02E-04	9.69E-05	1.04E-04	1.13E-04	1.05E-04	9.43E-05	8.36E-05	1.15E-04
PO-215	1.778E-3 S	1.69E-04	1.62E-04	1.74E-04	2.06E-04	1.79E-04	1.54E-04	1.40E-04	2.09E-04

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
TL-209	2.20 M	2.50E 00	2.49E 00	2.79E 00	3.21E 00	2.46E 00	2.27E 00	2.62E 00	2.42E 00
TL-210	1.30 M	3.40E 00	3.36E 00	3.76E 00	4.28E 00	3.33E 00	3.06E 00	3.54E 00	3.27E 00
PB-203	52.02 H	3.31E-01	3.12E-01	3.34E-01	4.93E-01	3.00E-01	2.68E-01	3.18E-01	2.95E-01
PB-204M	66.9 M	2.52E 00	2.43E 00	2.73E 00	3.12E 00	2.40E 00	2.17E 00	2.59E 00	2.35E 00
PB-205	1.51E7 Y	5.88E-06	2.76E-12	4.85E-07	4.31E-04	7.85E-07	1.23E-08	1.05E-08	2.48E-06
PB-209	3.253 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB-210	22.26 Y	8.80E-04	1.15E-03	8.26E-04	3.34E-03	7.41E-04	7.50E-04	9.32E-04	7.76E-04
PB-211	36.1 M	6.07E-02	5.80E-02	6.47E-02	7.58E-02	5.69E-02	5.14E-02	6.05E-02	5.58E-02
PB-212	10.643 H	1.63E-01	1.52E-01	1.62E-01	2.45E-01	1.47E-01	1.31E-01	1.56E-01	1.45E-01
PB-214	26.8 M	2.85E-01	2.66E-01	2.90E-01	3.87E-01	2.58E-01	2.32E-01	2.74E-01	2.55E-01
BI-206	6.243 D	3.93E 00	3.84E 00	4.30E 00	4.95E 00	3.78E 00	3.44E 00	4.02E 00	3.71E 00
BI-207	33.4 Y	1.83E 00	1.78E 00	1.99E 00	2.30E 00	1.75E 00	1.59E 00	1.86E 00	1.72E 00
BI-208	3.68E5 Y	3.55E 00	3.68E 00	4.07E 00	4.65E 00	3.69E 00	3.46E 00	3.91E 00	3.63E 00
BI-210	5.013 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BI-211	2.13 M	5.46E-02	5.09E-02	5.56E-02	7.29E-02	4.95E-02	4.44E-02	5.24E-02	4.89E-02
BI-212	60.55 M	2.21E-01	2.17E-01	2.43E-01	2.74E-01	2.14E-01	1.95E-01	2.27E-01	2.09E-01
BI-213	45.65 M	1.61E-01	1.52E-01	1.69E-01	2.08E-01	1.49E-01	1.34E-01	1.58E-01	1.46E-01
BI-214	19.9 M	1.85E 00	1.84E 00	2.07E 00	2.31E 00	1.83E 00	1.68E 00	1.94E 00	1.79E 00
PO-209	102 Y	4.09E-03	3.92E-03	4.34E-03	5.34E-03	3.84E-03	3.47E-03	4.08E-03	3.77E-03
PO-210	138.378 D	1.03E-05	9.97E-06	1.12E-05	1.26E-05	9.83E-06	8.89E-06	1.05E-05	9.61E-06
PO-211	0.516 S	9.35E-03	9.00E-03	1.01E-02	1.15E-02	8.86E-03	8.02E-03	9.42E-03	8.67E-03
PO-212	2.98E-7 S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PO-213	4.2E-6 S	3.70E-05	3.56E-05	4.00E-05	4.52E-05	3.51E-05	3.17E-05	3.73E-05	3.43E-05
PO-214	1.637E-4 S	1.01E-04	9.76E-05	1.10E-04	1.24E-04	9.62E-05	8.70E-05	1.02E-04	9.41E-05
PO-215	1.778E-3 S	1.73E-04	1.63E-04	1.81E-04	2.21E-04	1.59E-04	1.43E-04	1.69E-04	1.57E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/CUBIC CM

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
IR-192	74.02 D	1.45E 00	8.69E-01	8.73E-01	1.29E 00	9.74E-01	1.20E 00	7.77E-01	1.02E 00
IR-193M	11.9 D	1.25E-03	2.54E-04	2.61E-04	5.20E-04	3.77E-04	4.82E-04	2.20E-04	4.04E-04
IR-194	19.15 H	1.65E-01	9.90E-02	9.96E-02	1.45E-01	1.12E-01	1.37E-01	8.89E-02	1.16E-01
IR-194M	171 D	4.25E 00	2.52E 00	2.55E 00	3.72E 00	2.84E 00	3.48E 00	2.26E 00	2.97E 00
PT-191	2.71 D	5.02E-01	2.80E-01	2.83E-01	4.46E-01	3.40E-01	4.24E-01	2.48E-01	3.47E-01
PT-193	50 Y	7.15E-04	9.66E-07	8.73E-07	3.11E-05	7.15E-10	2.14E-06	3.12E-10	4.28E-05
PT-193M	4.33 D	1.80E-02	8.25E-03	8.47E-03	1.57E-02	1.21E-02	1.54E-02	7.19E-03	1.16E-02
PT-195M	4.02 D	1.17E-01	5.71E-02	5.83E-02	1.05E-01	8.08E-02	1.03E-01	4.97E-02	7.84E-02
PT-197	18.3 H	3.94E-02	2.11E-02	2.13E-02	3.58E-02	2.77E-02	3.52E-02	1.86E-02	2.73E-02
PT-197M	94.4 M	1.38E-01	7.52E-02	7.59E-02	1.22E-01	9.32E-02	1.17E-01	6.66E-02	9.46E-02
AU-194	39.5 H	2.03E 00	1.22E 00	1.24E 00	1.79E 00	1.40E 00	1.68E 00	1.12E 00	1.44E 00
AU-195	183 D	1.35E-01	6.59E-02	6.74E-02	1.23E-01	9.47E-02	1.21E-01	5.74E-02	9.14E-02
AU-195M	30.6 S	3.44E-01	2.05E-01	2.04E-01	3.09E-01	2.35E-01	2.96E-01	1.82E-01	2.44E-01
AU-196	6.183 D	8.28E-01	4.87E-01	4.88E-01	7.36E-01	5.56E-01	6.91E-01	4.34E-01	5.81E-01
AU-198	2.696 D	7.22E-01	4.31E-01	4.33E-01	6.36E-01	4.80E-01	5.91E-01	3.85E-01	5.06E-01
AU-199	3.139 D	1.52E-01	9.00E-02	8.95E-02	1.40E-01	1.07E-01	1.37E-01	7.95E-02	1.09E-01
HG-197	64.14 H	1.11E-01	5.46E-02	5.58E-02	1.01E-01	7.83E-02	9.97E-02	4.77E-02	7.52E-02
HG-197M	23.8 H	1.55E-01	8.75E-02	8.76E-02	1.42E-01	1.09E-01	1.39E-01	7.70E-02	1.09E-01
HG-203	46.60 D	3.97E-01	2.38E-01	2.38E-01	3.56E-01	2.70E-01	3.38E-01	2.12E-01	2.81E-01
TL-200	26.1 H	2.43E 00	1.45E 00	1.46E 00	2.12E 00	1.67E 00	2.01E 00	1.31E 00	1.70E 00
TL-201	73.06 H	1.51E-01	7.86E-02	7.97E-02	1.38E-01	1.07E-01	1.36E-01	6.90E-02	1.04E-01
TL-202	12.23 D	8.27E-01	4.82E-01	4.87E-01	7.30E-01	5.52E-01	6.82E-01	4.31E-01	5.77E-01
TL-204	3.779 Y	1.80E-03	8.83E-04	9.03E-04	1.63E-03	1.27E-03	1.62E-03	7.73E-04	1.22E-03
TL-207	4.77 M	4.11E-03	2.47E-03	2.52E-03	3.60E-03	2.87E-03	3.44E-03	2.22E-03	2.90E-03
TL-208	3.053 M	6.93E 00	4.35E 00	4.47E 00	6.20E 00	4.85E 00	5.65E 00	4.06E 00	5.02E 00

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
IR-192	74.02 D	9.20E-01	8.84E-01	9.53E-01	1.16E 00	9.76E-01	8.26E-01	7.62E-01	1.18E 00
IR-193M	11.9 D	3.00E-04	2.82E-04	3.14E-04	5.54E-04	1.85E-04	2.31E-04	1.85E-04	5.72E-04
IR-194	19.15 H	1.06E-01	1.01E-01	1.08E-01	1.27E-01	1.11E-01	9.49E-02	8.73E-02	1.30E-01
IR-194M	171 D	2.69E 00	2.58E 00	2.77E 00	3.23E 00	2.83E 00	2.46E 00	2.22E 00	3.28E 00
PT-191	2.71 D	3.06E-01	2.92E-01	3.16E-01	4.31E-01	2.85E-01	2.65E-01	2.34E-01	4.40E-01
PT-193	50 Y	5.13E-09	4.16E-08	3.39E-06	2.03E-06	1.11E-06	1.68E-06	2.50E-06	5.50E-06
PT-193M	4.33 D	9.63E-03	9.11E-03	1.00E-02	1.77E-02	6.10E-03	7.45E-03	6.01E-03	1.82E-02
PT-195M	4.02 D	6.50E-02	6.19E-02	6.83E-02	1.19E-01	4.48E-02	5.11E-02	4.26E-02	1.22E-01
PT-197	18.3 H	2.30E-02	2.22E-02	2.44E-02	3.96E-02	1.88E-02	1.88E-02	1.66E-02	4.07E-02
PT-197M	94.4 M	8.22E-02	7.86E-02	8.55E-02	1.23E-01	7.45E-02	6.96E-02	6.19E-02	1.26E-01
AU-194	39.5 H	1.33E 00	1.27E 00	1.35E 00	1.51E 00	1.35E 00	1.18E 00	1.09E 00	1.54E 00
AU-195	183 D	7.57E-02	7.20E-02	7.94E-02	1.39E-01	5.04E-02	5.92E-02	4.87E-02	1.43E-01
AU-195M	30.6 S	2.15E-01	2.08E-01	2.25E-01	3.02E-01	2.24E-01	1.86E-01	1.76E-01	3.08E-01
AU-196	6.183 D	5.17E-01	4.97E-01	5.37E-01	6.67E-01	5.33E-01	4.57E-01	4.20E-01	6.99E-01
AU-198	2.696 D	4.57E-01	4.39E-01	4.72E-01	5.64E-01	4.86E-01	4.14E-01	3.78E-01	5.73E-01
AU-199	3.139 D	9.34E-02	9.10E-02	9.98E-02	1.49E-01	9.16E-02	7.87E-02	7.49E-02	1.53E-01
HG-197	64.14 H	6.24E-02	5.96E-02	6.57E-02	1.15E-01	4.16E-02	4.90E-02	4.02E-02	1.18E-01
HG-197M	23.8 H	9.25E-02	9.00E-02	9.89E-02	1.55E-01	8.31E-02	7.72E-02	7.07E-02	1.59E-01
HG-203	46.60 D	2.50E-01	2.41E-01	2.61E-01	3.42E-01	2.64E-01	2.17E-01	2.06E-01	3.49E-01
TL-200	26.1 H	1.57E 00	1.49E 00	1.59E 00	1.80E 00	1.60E 00	1.41E 00	1.28E 00	1.83E 00
TL-201	73.06 H	8.72E-02	8.39E-02	9.24E-02	1.56E-01	6.58E-02	6.99E-02	6.01E-02	1.60E-01
TL-202	12.23 D	5.16E-01	4.96E-01	5.34E-01	6.63E-01	5.27E-01	4.64E-01	4.18E-01	6.75E-01
TL-204	3.779 Y	1.01E-03	9.65E-04	1.06E-03	1.87E-03	6.70E-04	7.92E-04	6.50E-04	1.92E-03
TL-207	4.77 M	2.69E-03	2.55E-03	2.72E-03	2.93E-03	2.76E-03	2.48E-03	2.20E-03	2.98E-03
TL-208	3.053 M	4.85E 00	4.53E 00	4.75E 00	4.95E 00	4.86E 00	4.08E 00	3.96E 00	5.03E 00

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
IR-192	74.02 D	9.51E-01	8.89E-01	9.77E-01	1.25E 00	8.67E-01	7.79E-01	9.19E-01	8.55E-01
IR-193M	11.9 D	2.63E-04	2.86E-04	2.75E-04	9.27E-04	2.45E-04	2.22E-04	2.64E-04	2.36E-04
IR-194	19.15 H	1.07E-01	1.02E-01	1.12E-01	1.38E-01	9.95E-02	9.00E-02	1.06E-01	9.81E-02
IR-194M	171 D	2.74E 00	2.60E 00	2.88E 00	3.49E 00	2.54E 00	2.29E 00	2.70E 00	2.49E 00
PT-191	2.71 D	3.00E-01	2.94E-01	3.14E-01	4.62E-01	2.78E-01	2.50E-01	2.96E-01	2.71E-01
PT-193	50 Y	4.28E-06	7.72E-13	3.41E-07	3.35E-04	5.58E-07	7.19E-09	1.06E-08	1.76E-06
PT-193M	4.33 D	8.46E-03	9.23E-03	8.98E-03	1.93E-02	8.01E-03	7.22E-03	8.60E-03	7.64E-03
PT-195M	4.02 D	5.92E-02	6.26E-02	6.19E-02	1.26E-01	5.57E-02	4.97E-02	5.99E-02	5.34E-02
PT-197	18.3 H	2.24E-02	2.24E-02	2.30E-02	4.15E-02	2.07E-02	1.84E-02	2.21E-02	2.01E-02
PY-197M	94.4 M	8.07E-02	7.93E-02	8.31E-02	1.32E-01	7.41E-02	6.66E-02	7.88E-02	7.24E-02
AU-194	39.5 H	1.28E 00	1.27E 00	1.41E 00	1.68E 00	1.25E 00	1.14E 00	1.33E 00	1.23E 00
AU-195	183 D	6.80E-02	7.28E-02	7.16E-02	1.48E-01	6.42E-02	5.75E-02	6.90E-02	6.14E-02
AU-195M	30.6 S	2.25E-01	2.09E-01	2.24E-01	3.21E-01	2.02E-01	1.81E-01	2.14E-01	2.00E-01
AU-196	6.183 D	5.31E-01	5.00E-01	5.43E-01	7.35E-01	4.83E-01	4.34E-01	5.12E-01	4.76E-01
AU-198	2.696 D	4.70E-01	4.41E-01	4.88E-01	6.05E-01	4.31E-01	3.87E-01	4.55E-01	4.24E-01
AU-199	3.139 D	9.80E-02	9.13E-02	9.69E-02	1.55E-01	8.86E-02	7.81E-02	9.43E-02	8.71E-02
HG-197	64.14 H	5.62E-02	6.02E-02	5.95E-02	1.22E-01	5.32E-02	4.77E-02	5.70E-02	5.07E-02
HG-197M	23.8 H	9.38E-02	9.04E-02	9.47E-02	1.61E-01	8.62E-02	7.59E-02	9.21E-02	8.38E-02
HG-203	46.60 D	2.62E-01	2.42E-01	2.61E-01	3.64E-01	2.35E-01	2.11E-01	2.49E-01	2.33E-01
TL-200	26.1 H	1.54E 00	1.50E 00	1.67E 00	1.97E 00	1.47E 00	1.34E 00	1.56E 00	1.44E 00
TL-201	73.06 H	8.23E-02	8.45E-02	8.54E-02	1.63E-01	7.70E-02	6.85E-02	8.23E-02	7.40E-02
TL-202	12.23 D	5.23E-01	4.99E-01	5.46E-01	7.11E-01	4.82E-01	4.33E-01	5.11E-01	4.73E-01
TL-204	3.779 Y	9.09E-04	9.74E-04	9.64E-04	1.97E-03	8.63E-04	7.71E-04	9.23E-04	8.21E-04
TL-207	4.77 M	2.65E-03	2.57E-03	2.89E-03	3.23E-03	2.54E-03	2.30E-03	2.70E-03	2.48E-03
TL-208	3.053 M	4.42E 00	4.51E 00	5.00E 00	5.71E 00	4.50E 00	4.19E 00	4.78E 00	4.43E 00

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/CUBIC CM

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
NP-240	65 M	1.38E 00	1.31E 00	1.40E 00	1.59E 00	1.42E 00	1.26E 00	1.13E 00	1.61E 00
NP-240M	7.4 M	3.92E-01	3.74E-01	4.00E-01	4.54E-01	4.01E-01	3.59E-01	3.22E-01	4.53E-01
PU-236	2.851 Y	5.42E-05	4.07E-05	5.66E-05	9.14E-04	2.85E-05	3.90E-05	3.29E-05	1.02E-04
PU-237	45.3 D	5.17E-02	4.61E-02	5.12E-02	8.45E-02	4.04E-02	3.94E-02	3.58E-02	8.70E-02
PU-238	87.74 Y	2.17E-05	1.93E-05	1.18E-05	4.83E-05	1.43E-05	2.10E-05	1.85E-05	5.65E-05
PU-239	24131 Y	5.63E-05	5.55E-05	6.55E-05	1.03E-04	5.27E-05	4.94E-05	4.65E-05	1.08E-04
PU-240	6537 Y	2.13E-05	2.05E-05	3.26E-05	5.03E-05	1.41E-05	2.17E-05	1.85E-05	5.81E-05
PU-241	14.4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PU-242	3.763E5 Y	2.10E-05	1.89E-05	2.90E-05	4.52E-05	1.33E-05	1.93E-05	1.67E-05	5.18E-05
PU-243	4.956 H	2.33E-02	2.26E-02	2.49E-02	4.11E-02	1.85E-02	1.91E-02	1.63E-02	4.23E-02
PU-244	8.26E7 Y	8.86E-06	6.52E-06	1.43E-05	1.95E-05	5.49E-06	8.89E-06	8.19E-06	2.46E-05
PU-245	10.5 H	4.85E-01	5.65E-01	5.00E-01	5.81E-01	5.05E-01	4.41E-01	4.00E-01	5.98E-01
PU-246	10.85 D	1.08E-01	9.71E-02	1.06E-01	1.40E-01	1.02E-01	8.52E-02	8.12E-02	1.52E-01
AM-241	432.2 Y	1.87E-02	1.40E-02	1.87E-02	3.36E-02	1.01E-02	1.31E-02	1.05E-02	3.44E-02
AM-242	16.02 H	1.34E-02	1.33E-02	1.47E-02	2.39E-02	1.19E-02	1.13E-02	1.05E-02	2.43E-02
AM-242M	152 Y	2.06E-04	2.43E-04	3.09E-04	4.91E-04	2.11E-04	2.25E-04	2.04E-04	5.20E-04
AM-243	7.380E3 Y	5.04E-02	4.81E-02	5.31E-02	9.20E-02	3.41E-02	3.96E-02	3.28E-02	9.53E-02
AM-244	10.1 H	9.66E-01	9.20E-01	9.84E-01	1.09E 00	9.94E-01	8.89E-01	7.92E-01	1.11E 00
AM-245	122.4 M	3.27E-02	3.13E-02	3.48E-02	5.05E-02	3.23E-02	2.80E-02	2.65E-02	5.13E-02
AM-246	25.0 M	1.21E 00	1.15E 00	1.22E 00	1.31E 00	1.23E 00	1.10E 00	9.84E-01	1.33E 00
CM-242	163.2 D	2.05E-05	1.89E-05	3.41E-05	5.04E-05	1.55E-05	2.22E-05	2.00E-05	5.99E-05
CM-243	28.5 Y	1.33E-01	1.29E-01	1.41E-01	2.04E-01	1.32E-01	1.13E-01	1.07E-01	2.09E-01
CM-244	18.11 Y	1.42E-05	1.29E-05	2.62E-05	3.74E-05	1.13E-05	1.65E-05	1.53E-05	4.56E-05
CM-245	8.5E3 Y	7.05E-02	6.94E-02	7.69E-02	1.22E-01	6.52E-02	5.97E-02	5.53E-02	1.26E-01
CM-246	4.73E3 Y	9.25E-06	7.08E-06	1.83E-05	2.42E-05	6.89E-06	1.12E-05	1.06E-05	3.13E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
NP-240	65 M	1.37E 00	1.32E 00	1.48E 00	1.73E 00	1.30E 00	1.17E 00	1.38E 00	1.27E 00
NP-240M	7.4 M	3.90E-01	3.76E-01	4.21E-01	4.88E-01	3.69E-01	3.34E-01	3.92E-01	3.62E-01
PU-236	2.851 Y	4.89E-05	4.09E-05	3.95E-05	5.88E-04	3.60E-05	3.12E-05	3.67E-05	3.93E-05
PU-237	45.3 D	4.81E-02	4.63E-02	4.84E-02	8.89E-02	4.45E-02	3.85E-02	4.82E-02	4.30E-02
PU-238	87.75 Y	2.80E-05	1.94E-05	1.85E-05	4.88E-04	1.72E-05	1.44E-05	1.69E-05	2.10E-05
PU-239	24131 Y	6.30E-05	5.53E-05	5.92E-05	2.70E-04	5.48E-05	4.67E-05	5.83E-05	5.47E-05
PU-240	6537 Y	2.85E-05	2.07E-05	1.94E-05	4.70E-04	1.79E-05	1.52E-05	1.80E-05	2.16E-05
PU-241	14.4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PU-242	3.758E5 Y	2.53E-05	1.90E-05	1.80E-05	3.93E-04	1.66E-05	1.41E-05	1.66E-05	1.95E-05
PU-243	4.956 H	2.26E-02	2.27E-02	2.34E-02	4.30E-02	2.12E-02	1.86E-02	2.27E-02	2.03E-02
PU-244	8.26E7 Y	1.30E-05	7.06E-06	5.61E-06	3.22E-04	5.63E-06	4.52E-06	5.62E-06	8.74E-06
PU-245	10.57 H	4.92E-01	4.48E-01	5.19E-01	6.35E-01	4.59E-01	4.13E-01	4.88E-01	4.51E-01
PU-246	10.85 D	1.05E-01	9.86E-02	1.02E-01	1.63E-01	9.32E-02	8.39E-02	1.00E-01	9.31E-02
AM-241	432.2 Y	1.51E-02	1.73E-02	1.58E-02	3.97E-02	1.40E-02	1.30E-02	1.54E-02	1.36E-02
AM-242	16.02 H	1.39E-02	1.32E-02	1.39E-02	2.60E-02	1.28E-02	1.10E-02	1.38E-02	1.24E-02
AM-242M	152 Y	2.85E-04	2.45E-04	2.48E-04	1.87E-03	2.30E-04	1.97E-04	2.44E-04	2.41E-04
AM-243	7.38E3 Y	4.57E-02	4.86E-02	4.82E-02	9.88E-02	4.32E-02	3.86E-02	4.64E-02	4.12E-02
AM-244	10.1 H	9.61E-01	9.25E-01	1.04E 00	1.20E 00	9.12E-01	8.23E-01	9.70E-01	8.92E-01
AM-245	122.4 M	3.44E-02	3.19E-02	3.41E-02	5.31E-02	3.11E-02	2.74E-02	3.32E-02	3.06E-02
AM-246	25.0 M	1.18E 00	1.15E 00	1.30E 00	1.45E 00	1.14E 00	1.04E 00	1.21E 00	1.11E 00
CM-242	163.2 D	3.06E-05	1.83E-05	1.87E-05	5.42E-04	1.77E-05	1.40E-05	1.63E-05	2.25E-05
CM-243	28.5 Y	1.39E-01	1.29E-01	1.38E-01	2.16E-01	1.26E-01	1.11E-01	1.34E-01	1.24E-01
CM-244	18.11 Y	2.38E-05	1.24E-05	1.28E-05	4.76E-04	1.24E-05	9.46E-06	1.09E-05	1.69E-05
CM-245	8.5E3 Y	7.39E-02	6.96E-02	7.36E-02	1.28E-01	6.77E-02	5.87E-02	7.30E-02	6.59E-02
CM-246	4.75E3 Y	1.69E-05	7.12E-06	6.36E-06	4.17E-04	6.59E-06	4.75E-06	5.71E-06	1.11E-05

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
TH-232	1.405E10 Y	7.40E-04	1.32E-04	1.35E-04	2.79E-04	1.85E-04	2.41E-04	1.12E-04	2.22E-04
TH-233	22.3 M	6.12E-02	3.54E-02	3.57E-02	5.34E-02	4.06E-02	5.01E-02	3.15E-02	4.23E-02
TH-234	24.10 D	1.38E-02	6.93E-03	7.01E-03	1.22E-02	9.40E-03	1.21E-02	6.02E-03	9.26E-03
PA-230	17.4 D	1.23E 00	7.28E-01	7.41E-01	1.07E 00	8.48E-01	1.02E 00	6.53E-01	8.60E-01
PA-231	3.276E4 Y	5.58E-02	3.07E-02	3.06E-02	4.70E-02	3.49E-02	4.39E-02	2.72E-02	3.70E-02
PA-233	27.0 D	3.72E-01	2.20E-01	2.20E-01	3.32E-01	2.51E-01	3.15E-01	1.95E-01	2.62E-01
PA-234	6.70 H	3.69E 00	2.19E 00	2.23E 00	3.21E 00	2.54E 00	3.05E 00	1.98E 00	2.58E 00
PA-234M	1.17 M	2.18E-02	1.29E-02	1.32E-02	1.88E-02	1.50E-02	1.80E-02	1.16E-02	1.52E-02
U-230	20.8 D	2.55E-03	1.01E-03	1.01E-03	1.71E-03	1.27E-03	1.62E-03	8.90E-04	1.34E-03
U-231	4.2 D	1.22E-01	6.40E-02	6.42E-02	1.07E-01	8.19E-02	1.06E-01	5.56E-02	8.25E-02
U-232	72 Y	1.11E-03	1.89E-04	1.91E-04	3.96E-04	2.50E-04	3.30E-04	1.61E-04	3.20E-04
U-233	1.592E5 Y	6.04E-04	2.13E-04	2.12E-04	3.59E-04	2.61E-04	3.39E-04	1.85E-04	2.85E-04
U-234	2.445E5 Y	8.35E-04	8.95E-05	9.11E-05	2.20E-04	1.21E-04	1.64E-04	7.41E-05	1.83E-04
U-235	7.038E8 Y	2.58E-01	1.55E-01	1.54E-01	2.36E-01	1.81E-01	2.30E-01	1.37E-01	1.85E-01
U-236	2.3415E7 Y	7.47E-04	6.28E-05	6.45E-05	1.70E-04	8.87E-05	1.21E-04	5.25E-05	1.44E-04
U-237	6.75 D	2.33E-01	1.29E-01	1.29E-01	2.10E-01	1.60E-01	2.04E-01	1.13E-01	1.62E-01
U-238	4.468E9 Y	6.56E-04	5.22E-05	5.37E-05	1.45E-04	7.44E-05	1.02E-04	4.34E-05	1.24E-04
U-239	23.40 M	8.28E-02	4.27E-02	4.35E-02	7.44E-02	5.78E-02	7.28E-02	3.76E-02	5.65E-02
U-240	14.1 H	4.07E-03	3.05E-04	3.29E-04	1.12E-03	5.41E-04	7.57E-04	2.37E-04	8.77E-04
NP-235	396.1 D	5.52E-03	1.71E-03	1.71E-03	3.04E-03	2.15E-03	2.81E-03	1.47E-03	2.40E-03
NP-236	1.15E6 Y	2.25E-01	1.26E-01	1.26E-01	2.02E-01	1.55E-01	2.00E-01	1.10E-01	1.57E-01
NP-236M	22.5 H	8.67E-02	5.00E-02	5.02E-02	8.01E-02	6.17E-02	7.86E-02	4.37E-02	6.22E-02
NP-237	2.14E6 Y	4.39E-02	2.06E-02	2.07E-02	3.62E-02	2.68E-02	3.49E-02	1.78E-02	2.75E-02
NP-238	2.117 D	1.06E 00	6.29E-01	6.41E-01	9.13E-01	7.32E-01	8.73E-01	5.67E-01	7.36E-01
NP-239	2.355 D	2.87E-01	1.67E-01	1.67E-01	2.60E-01	1.98E-01	2.52E-01	1.47E-01	2.03E-01

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
TH-232	1.405E10 Y	1.52E-04	1.42E-04	1.61E-04	2.72E-04	1.06E-04	1.20E-04	1.01E-04	2.82E-04
TH-233	22.3 M	3.79E-02	3.63E-02	3.91E-02	4.81E-02	3.85E-02	3.41E-02	3.07E-02	4.90E-02
TH-234	24.10 D	7.62E-03	7.33E-03	8.13E-03	1.39E-02	5.71E-03	6.14E-03	5.29E-03	1.43E-02
PA-230	17.4 D	7.88E-01	7.50E-01	8.03E-01	9.15E-01	7.99E-01	7.18E-01	6.42E-01	9.32E-01
PA-231	3.276E4 Y	3.25E-02	3.10E-02	3.37E-02	4.43E-02	3.37E-02	2.82E-02	2.65E-02	4.53E-02
PA-233	27.0 D	2.31E-01	2.23E-01	2.42E-01	3.21E-01	2.39E-01	2.02E-01	1.89E-01	3.28E-01
PA-234	6.70 H	2.38E 00	2.26E 00	2.42E 00	2.69E 00	2.43E 00	2.16E 00	1.95E 00	2.74E 00
PA-234M	1.17 M	1.40E-02	1.33E-02	1.42E-02	1.55E-02	1.43E-02	1.29E-02	1.15E-02	1.58E-02
U-230	20.8 D	1.08E-03	1.04E-03	1.15E-03	1.78E-03	9.69E-04	8.98E-04	8.22E-04	1.83E-03
U-231	4.2 D	6.77E-02	6.58E-02	7.32E-02	1.21E-01	5.68E-02	5.61E-02	5.05E-02	1.25E-01
U-232	72 Y	2.09E-04	1.97E-04	2.26E-04	3.66E-04	1.64E-04	1.70E-04	1.50E-04	3.82E-04
U-233	1.592E5 Y	2.18E-04	2.14E-04	2.40E-04	3.84E-04	2.01E-04	1.86E-04	1.74E-04	3.97E-04
U-234	2.445E5 Y	1.01E-04	9.34E-05	1.11E-04	1.81E-04	7.46E-05	8.20E-05	7.15E-05	1.92E-04
U-235	7.038E8 Y	1.60E-01	1.56E-01	1.71E-01	2.47E-01	1.64E-01	1.36E-01	1.31E-01	2.53E-01
U-236	2.3415E7 Y	7.06E-05	6.70E-05	8.08E-05	1.37E-04	4.65E-05	5.82E-05	4.85E-05	1.46E-04
U-237	6.75 D	1.37E-01	1.32E-01	1.46E-01	2.24E-01	1.25E-01	1.14E-01	1.05E-01	2.30E-01
U-238	4.468E9 Y	5.92E-05	5.58E-05	6.77E-05	1.15E-04	3.82E-05	4.86E-05	4.02E-05	1.22E-04
U-239	23.40 M	4.80E-02	4.58E-02	5.01E-02	7.99E-02	3.67E-02	3.94E-02	3.32E-02	8.19E-02
U-240	14.1 H	5.06E-04	3.60E-04	4.41E-04	7.56E-04	1.90E-04	3.11E-04	2.27E-04	8.00E-04
NP-235	396.1 D	1.77E-03	1.73E-03	1.96E-03	3.21E-03	1.53E-03	1.49E-03	1.36E-03	3.33E-03
NP-236	1.15E6 Y	1.31E-01	1.28E-01	1.42E-01	2.24E-01	1.21E-01	1.10E-01	1.03E-01	2.31E-01
NP-236M	22.5 H	5.27E-02	5.11E-02	5.63E-02	8.56E-02	4.77E-02	4.52E-02	4.08E-02	8.80E-02
NP-237	2.14E6 Y	2.26E-02	2.14E-02	2.38E-02	3.93E-02	1.81E-02	1.82E-02	1.62E-02	4.05E-02
NP-238	2.117 D	6.86E-01	6.50E-01	6.92E-01	7.39E-01	7.00E-01	6.29E-01	5.61E-01	7.52E-01
NP-239	2.355 D	1.74E-01	1.69E-01	1.86E-01	2.71E-01	1.72E-01	1.49E-01	1.40E-01	2.78E-01

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/CUBIC CM

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
TH-232	1.405E10 Y	1.41E-04	1.44E-04	1.40E-04	5.41E-04	1.27E-04	1.13E-04	1.37E-04	1.25E-04
TH-233	22.3 M	3.83E-02	3.65E-02	4.01E-02	5.22E-02	3.55E-02	3.18E-02	3.78E-02	3.48E-02
TH-234	24.10 D	7.26E-03	7.40E-03	7.49E-03	1.48E-02	6.79E-03	5.98E-03	7.33E-03	6.53E-03
PA-230	17.4 D	7.80E-01	7.55E-01	8.43E-01	9.99E-01	7.42E-01	6.71E-01	7.91E-01	7.26E-01
PA-231	3.276E4 Y	3.37E-02	3.13E-02	3.36E-02	4.99E-02	3.03E-02	2.71E-02	3.23E-02	3.00E-02
PA-233	27.0 D	2.41E-01	2.24E-01	2.43E-01	3.42E-01	2.18E-01	1.94E-01	2.31E-01	2.15E-01
PA-234	6.70 H	2.34E 00	2.27E 00	2.54E 00	2.96E 00	2.24E 00	2.03E 00	2.38E 00	2.19E 00
PA-234M	1.17 M	1.38E-02	1.34E-02	1.51E-02	1.71E-02	1.32E-02	1.20E-02	1.41E-02	1.29E-02
U-230	20.8 D	1.09E-03	1.05E-03	1.09E-03	2.27E-03	9.92E-04	8.80E-04	1.05E-03	9.71E-04
U-231	4.2 D	6.80E-02	6.62E-02	6.89E-02	1.29E-01	6.31E-02	5.48E-02	6.83E-02	6.10E-02
U-232	72 Y	2.06E-04	2.00E-04	2.00E-04	7.98E-04	1.82E-04	1.61E-04	1.95E-04	1.81E-04
U-233	1.592E5 Y	2.31E-04	2.15E-04	2.28E-04	5.23E-04	2.11E-04	1.81E-04	2.26E-04	2.05E-04
U-234	2.445E5 Y	9.98E-05	9.52E-05	9.30E-05	5.53E-04	8.49E-05	7.51E-05	9.17E-05	8.61E-05
U-235	7.038E8 Y	1.71E-01	1.56E-01	1.67E-01	2.58E-01	1.53E-01	1.35E-01	1.63E-01	1.51E-01
U-236	2.3415E7 Y	6.95E-05	6.75E-05	6.65E-05	4.79E-04	5.97E-05	5.28E-05	6.26E-05	5.98E-05
U-237	6.75 D	1.39E-01	1.33E-01	1.39E-01	2.39E-01	1.27E-01	1.12E-01	1.36E-01	1.24E-01
U-238	4.468E9 Y	5.80E-05	5.63E-05	5.50E-05	4.19E-04	4.94E-05	4.38E-05	5.18E-05	4.97E-05
U-239	23.40 M	4.46E-02	4.63E-02	4.73E-02	8.49E-02	4.21E-02	3.77E-02	4.51E-02	4.05E-02
U-240	14.1 H	3.48E-04	4.14E-04	2.78E-04	2.79E-03	2.55E-04	2.59E-04	3.29E-04	2.91E-04
NP-235	396.1 D	1.84E-03	1.74E-03	1.82E-03	4.70E-03	1.68E-03	1.45E-03	1.81E-03	1.63E-03
NP-236	1.15E6 Y	1.36E-01	1.28E-01	1.36E-01	2.36E-01	1.25E-01	1.08E-01	1.34E-01	1.21E-01
NP-236M	22.5 H	5.34E-02	5.14E-02	5.48E-02	8.98E-02	4.97E-02	4.35E-02	5.35E-02	4.82E-02
NP-237	2.14E6 Y	2.19E-02	2.17E-02	2.21E-02	4.49E-02	2.02E-02	1.77E-02	2.19E-02	1.96E-02
NP-238	2.117 D	6.70E-01	6.53E-01	7.36E-01	8.20E-01	6.46E-01	5.88E-01	6.88E-01	6.32E-01
NP-239	2.355 D	1.82E-01	1.70E-01	1.81E-01	2.85E-01	1.65E-01	1.46E-01	1.77E-01	1.62E-01

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/CUBIC CM

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
PO-216	0.146 S	2.76E-05	1.64E-05	1.67E-05	2.39E-05	1.89E-05	2.27E-05	1.47E-05	1.92E-05
PO-218	3.05 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AT-211	7.214 H	6.37E-02	3.35E-02	3.40E-02	5.84E-02	4.56E-02	5.81E-02	2.94E-02	4.43E-02
AT-217	0.0323 S	4.39E-04	2.60E-04	2.64E-04	3.82E-04	2.94E-04	3.57E-04	2.32E-04	3.06E-04
RN-218	0.035 S	1.40E-03	8.28E-04	8.41E-04	1.22E-03	9.38E-04	1.14E-03	7.40E-04	9.73E-04
RN-219	3.96 S	1.01E-01	6.04E-02	6.04E-02	8.97E-02	6.78E-02	8.43E-02	5.39E-02	7.11E-02
RN-220	55.61 S	9.55E-04	5.65E-04	5.72E-04	8.33E-04	6.35E-04	7.74E-04	5.06E-04	6.65E-04
RN-222	3.8235 D	7.05E-04	4.18E-04	4.22E-04	6.16E-04	4.67E-04	5.71E-04	3.74E-04	4.92E-04
FR-221	4.8 M	5.30E-02	3.18E-02	3.17E-02	4.81E-02	3.67E-02	4.63E-02	2.83E-02	3.78E-02
FR-223	21.8 M	8.53E-02	4.27E-02	4.33E-02	7.39E-02	5.52E-02	7.02E-02	3.72E-02	5.63E-02
RA-222	38.0 S	1.61E-02	9.69E-03	9.69E-03	1.44E-02	1.08E-02	1.35E-02	8.66E-03	1.14E-02
RA-223	11.434 D	2.31E-01	1.34E-01	1.34E-01	2.09E-01	1.60E-01	2.02E-01	1.19E-01	1.63E-01
RA-224	3.62 D	1.73E-02	1.04E-02	1.04E-02	1.56E-02	1.19E-02	1.49E-02	9.30E-03	1.23E-02
RA-225	14.8 D	1.72E-02	3.80E-03	4.18E-03	1.21E-02	7.64E-03	1.01E-02	3.06E-03	8.16E-03
RA-226	1600 Y	1.15E-02	6.93E-03	6.87E-03	1.05E-02	8.07E-03	1.02E-02	6.14E-03	8.26E-03
RA-228	5.75 Y	1.04E-09	1.40E-12	1.27E-12	4.91E-11	1.04E-15	3.11E-12	4.94E-16	6.22E-11
AC-225	10.0 D	2.37E-02	1.30E-02	1.30E-02	2.10E-02	1.61E-02	2.07E-02	1.14E-02	1.63E-02
AC-227	21.773 Y	2.71E-04	1.16E-04	1.16E-04	1.91E-04	1.42E-04	1.84E-04	1.01E-04	1.50E-04
AC-228	6.13 H	1.75E 00	1.05E 00	1.06E 00	1.52E 00	1.21E 00	1.45E 00	9.44E-01	1.22E 00
TH-226	30.9 M	1.35E-02	7.74E-03	7.71E-03	1.22E-02	9.32E-03	1.19E-02	6.80E-03	9.48E-03
TH-227	18.718 D	1.83E-01	1.07E-01	1.07E-01	1.63E-01	1.23E-01	1.55E-01	9.48E-02	1.28E-01
TH-228	1.9132 Y	3.79E-03	1.84E-03	1.84E-03	3.05E-03	2.33E-03	2.98E-03	1.64E-03	2.37E-03
TH-229	7.34E3 Y	1.49E-01	8.19E-02	8.20E-02	1.34E-01	1.03E-01	1.32E-01	7.17E-02	1.03E-01
TH-230	7.7E4 Y	1.09E-03	3.23E-04	3.27E-04	6.01E-04	4.37E-04	5.60E-04	2.82E-04	4.68E-04
TH-231	25.52 H	2.56E-02	9.89E-03	1.00E-02	1.84E-02	1.31E-02	1.73E-02	8.48E-03	1.40E-02

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
PO-216	0.146 S	1.78E-05	1.69E-05	1.80E-05	1.96E-05	1.83E-05	1.64E-05	1.46E-05	1.99E-05
PO-218	3.05 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AT-211	7.214 H	3.68E-02	3.57E-02	3.93E-02	6.66E-02	2.76E-02	2.99E-02	2.56E-02	6.84E-02
AT-217	0.0323 S	2.79E-04	2.67E-04	2.86E-04	3.22E-04	2.92E-04	2.58E-04	2.30E-04	3.27E-04
RN-218	0.035 S	8.90E-04	8.50E-04	9.11E-04	1.02E-03	9.30E-04	8.23E-04	7.32E-04	1.04E-03
RN-219	3.96 S	6.35E-02	6.12E-02	6.61E-02	8.34E-02	6.75E-02	5.63E-02	5.26E-02	8.49E-02
RN-220	55.61 S	6.06E-04	5.80E-04	6.22E-04	7.08E-04	6.36E-04	5.59E-04	4.99E-04	7.20E-04
RN-222	3.8235 D	4.46E-04	4.28E-04	4.59E-04	5.29E-04	4.70E-04	4.11E-04	3.68E-04	5.37E-04
FR-221	4.8 M	3.32E-02	3.21E-02	3.49E-02	4.84E-02	3.45E-02	2.03E-02	2.72E-02	4.95E-02
FR-223	21.8 M	4.85E-02	4.51E-02	4.95E-02	7.42E-02	4.03E-02	3.95E-02	3.45E-02	7.60E-02
RA-222	38.0 S	1.02E-02	9.82E-03	1.06E-02	1.33E-02	1.09E-02	9.03E-03	8.47E-03	1.36E-02
RA-223	11.434 D	1.41E-01	1.37E-01	1.50E-01	2.15E-01	1.37E-01	1.21E-01	1.12E-01	2.20E-01
RA-224	3.62 D	1.09E-02	1.05E-02	1.14E-02	1.53E-02	1.15E-02	9.37E-03	9.01E-03	1.57E-02
RA-225	14.8 D	7.75E-03	4.84E-03	5.40E-03	9.60E-03	2.25E-03	3.92E-03	2.63E-03	9.79E-03
RA-226	1600 Y	7.16E-03	6.97E-03	7.61E-03	1.09E-02	7.33E-03	6.07E-03	5.87E-03	1.12E-02
RA-228	5.75 Y	7.46E-15	6.05E-14	4.92E-12	2.95E-12	1.61E-12	2.44E-12	3.63E-12	7.98E-12
AC-225	10.0 D	1.37E-02	1.33E-02	1.47E-02	2.30E-02	1.24E-02	1.15E-02	1.06E-02	2.37E-02
AC-227	21.773 Y	1.19E-04	1.17E-04	1.30E-04	2.08E-04	1.10E-04	1.01E-04	9.44E-05	2.15E-04
AC-228	6.13 H	1.13E 00	1.08E 00	1.15E 00	1.26E 00	1.14E 00	1.03E 00	9.31E-01	1.20E 00
TH-226	30.9 M	8.02E-03	7.83E-03	8.62E-03	1.31E-02	7.68E-03	6.80E-03	6.39E-03	1.35E-02
TH-227	18.718 D	1.12E-01	1.08E-01	1.18E-01	1.59E-01	1.16E-01	9.69E-02	9.16E-02	1.62E-01
TH-228	1.9132 Y	1.97E-03	1.92E-03	2.11E-03	3.32E-03	1.76E-03	1.64E-03	1.50E-03	3.41E-03
TH-229	7.3463 Y	8.66E-02	8.42E-02	9.29E-02	1.49E-01	7.58E-02	7.19E-02	6.56E-02	1.53E-01
TH-230	7.7E4 Y	3.59E-04	3.43E-04	3.82E-04	6.31E-04	2.75E-04	2.89E-04	2.51E-04	6.51E-04
TH-231	25.52 H	1.10E-02	1.03E-02	1.16E-02	1.96E-02	8.29E-03	8.78E-03	7.65E-03	2.02E-02

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
KR-81	2.1E5 Y	0.0	0.0	0.0	0.0	0.0
KR-83M	1.83 H	0.0	0.0	0.0	0.0	0.0
KR-85	10.72 Y	4.46E-01	4.88E-02	2.57E-03	1.07E-01	4.12E-01
KR-85M	4.48 H	4.55E-01	6.67E-02	8.54E-03	1.22E-01	4.23E-01
KR-87	76.3 M	2.89E 00	2.07E 00	1.54E 00	2.12E 00	2.86E 00
KR-88	2.84 H	6.92E-01	3.29E-01	2.23E-01	3.72E-01	6.61E-01
KR-89	3.16 M	2.98E 00	2.17E 00	1.64E 00	2.21E 00	2.95E 00
KR-90	32.32 S	2.85E 00	2.01E 00	1.48E 00	2.06E 00	2.82E 00
RB-81	4.58 H	3.73E-01	8.30E-02	2.13E-02	1.21E-01	3.46E-01
RB-82	1.25 M	3.07E 00	2.22E 00	1.64E 00	2.27E 00	3.04E 00
RB-83	86.2 D	0.0	0.0	0.0	0.0	0.0
RB-84	32.9 D	3.28E-01	1.31E-01	6.17E-02	1.53E-01	3.17E-01
RB-86	18.66 D	1.40E 00	7.22E-01	3.93E-01	7.79E-01	1.36E 00
RB-87	4.73E10 Y	4.18E-02	0.0	0.0	1.47E-02	4.47E-02
RB-88	17.8 M	4.67E 00	3.76E 00	3.08E 00	3.80E 00	4.64E 00
RB-89	15.44 M	2.19E 00	1.44E 00	1.02E 00	1.49E 00	2.16E 00
RB-90	157 S	4.40E 00	3.52E 00	2.89E 00	3.56E 00	4.38E 00
RB-90M	258 S	3.05E 00	2.23E 00	1.70E 00	2.28E 00	3.02E 00
SR-82	25.0 D	0.0	0.0	0.0	0.0	0.0
SR-85	64.84 D	6.23E-03	1.43E-03	2.79E-05	2.00E-03	5.98E-03
SR-85M	67.66 M	9.14E-03	0.0	0.0	5.92E-04	7.87E-03
SR-87M	2.805 H	1.24E-01	6.82E-03	0.0	3.10E-02	1.17E-01
SR-89	50.55 D	1.21E 00	5.49E-01	2.57E-01	6.10E-01	1.17E 00
SR-90	28.6 Y	3.22E-01	1.29E-02	5.54E-05	6.22E-02	2.89E-01
SR-91	9.5 H	1.36E 00	7.18E-01	4.30E-01	7.76E-01	1.32E 00
SR-92	2.71 H	3.20E-01	4.50E-02	2.17E-02	8.70E-02	2.93E-01
SR-93	7.3 M	1.92E 00	1.13E 00	7.22E-01	1.23E 00	1.88E 00
Y-86	14.74 H	4.63E-01	2.25E-01	1.18E-01	2.47E-01	4.51E-01
Y-87	80.3 H	2.69E-03	4.15E-04	1.99E-06	7.25E-04	2.53E-03
Y-88	106.60 D	1.49E-03	2.48E-04	2.38E-05	4.18E-04	1.40E-03
Y-90	64.1 H	2.01E 00	1.25E 00	8.00E-01	1.30E 00	1.98E 00
Y-90M	3.19 H	8.84E-02	1.46E-02	5.80E-05	2.45E-02	8.36E-02
Y-91	58.51 D	1.25E 00	5.87E-01	2.85E-01	6.47E-01	1.22E 00
Y-91M	49.71 M	5.38E-02	1.54E-02	1.00E-03	1.94E-02	5.20E-02
Y-92	3.54 H	3.20E 00	2.35E 00	1.78E 00	2.39E 00	3.17E 00
Y-93	10.1 H	2.57E 00	1.75E 00	1.24E 00	1.80E 00	2.53E 00
ZR-86	16.5 H	1.56E-02	0.0	0.0	3.03E-03	1.37E-02
ZR-88	83.4 D	1.94E-02	1.15E-03	0.0	5.33E-03	1.83E-02
ZR-89	78.43 H	1.90E-01	4.63E-02	1.03E-02	6.43E-02	1.81E-01
ZR-93	1.53E6 Y	0.0	0.0	0.0	0.0	0.0
ZR-95	64.02 D	1.36E-01	1.42E-03	2.52E-04	2.37E-02	1.12E-01
ZR-97	16.90 H	1.44E 00	7.56E-01	4.15E-01	8.13E-01	1.41E 00
NB-90	14.60 H	7.65E-01	3.32E-01	1.51E-01	3.74E-01	7.32E-01
NB-91	1E4 Y	1.67E-04	0.0	0.0	3.06E-05	1.18E-04
NB-91M	61 D	3.63E-02	0.0	0.0	6.72E-04	1.16E-02
NB-92	3.6E7 Y	2.86E-03	8.16E-04	5.34E-05	1.03E-03	2.76E-03
NB-92M	10.15 D	0.0	0.0	0.0	0.0	0.0
NB-93M	14.6 Y	0.0	0.0	0.0	0.0	0.0
NB-94	2.03E4 Y	2.02E-01	2.98E-03	2.60E-04	3.57E-02	1.74E-01

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ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
MN-54	312.7 D	0.0	0.0	0.0	0.0	0.0
MN-56	2.5785 H	1.75E 00	1.07E 00	7.18E-01	1.12E 00	1.71E 00
MN-57	1.47 M	2.36E 00	1.55E 00	1.05E 00	1.60E 00	2.33E 00
FE-52	8.275 H	3.65E-01	5.78E-02	6.41E-03	1.00E-01	3.42E-01
FE-55	2.7 Y	0.0	0.0	0.0	0.0	0.0
FE-59	44.63 D	1.41E-01	2.07E-03	4.81E-04	2.50E-02	1.17E-01
CO-56	78.76 D	2.46E-01	1.08E-01	4.73E-02	1.21E-01	2.39E-01
CO-57	270.9 D	4.01E-03	0.0	0.0	2.58E-04	2.51E-03
CO-58	70.80 D	4.76E-02	6.47E-04	4.94E-08	8.36E-03	4.19E-02
CO-58M	9.15 H	0.0	0.0	0.0	0.0	0.0
CO-60	5.271 Y	9.33E-02	1.01E-06	0.0	2.33E-02	7.21E-02
CO-60M	10.47 M	2.88E-03	1.29E-03	5.93E-04	1.44E-03	2.80E-03
CO-61	1.650 H	9.09E-01	3.18E-01	1.12E-01	3.82E-01	8.74E-01
NI-56	6.10 D	2.73E-03	0.0	0.0	6.07E-04	2.15E-03
NI-57	36.08 H	2.63E-01	4.52E-02	5.83E-03	7.49E-02	2.47E-01
NI-59	7.5E4 Y	0.0	0.0	0.0	0.0	0.0
NI-63	100.1 Y	0.0	0.0	0.0	0.0	0.0
NI-65	2.520 H	1.30E 00	6.81E-01	4.00E-01	7.37E-01	1.26E 00
CU-61	3.408 H	6.16E-01	2.11E-01	7.01E-02	2.55E-01	5.93E-01
CU-62	9.74 M	2.79E 00	1.94E 00	1.38E 00	1.99E 00	2.76E 00
CU-64	12.701 H	1.99E-01	1.19E-02	2.71E-04	4.12E-02	1.81E-01
CU-67	61.88 D	1.94E-01	3.03E-03	1.81E-05	3.44E-02	1.64E-01
ZN-62	9.26 H	3.44E-02	2.08E-03	3.19E-05	7.12E-03	3.14E-02
ZN-65	244.4 D	2.59E-03	1.74E-07	0.0	6.46E-04	2.09E-03
ZN-69	55.6 M	5.91E-01	1.16E-01	1.93E-02	1.79E-01	5.56E-01
ZN-69M	13.76 H	4.27E-02	5.67E-03	3.44E-09	1.09E-02	4.07E-02
GA-66	9.40 H	2.12E 00	1.63E 00	1.28E 00	1.65E 00	2.10E 00
GA-67	3.261 D	8.66E-03	0.0	0.0	9.35E-04	2.11E-03
GA-68	68.0 M	1.55E 00	8.57E-01	4.81E-01	9.13E-01	1.52E 00
GA-72	14.1 H	1.00E 00	4.76E-01	2.89E-01	5.32E-01	9.67E-01
GE-68	288 D	0.0	0.0	0.0	0.0	0.0
GE-71	11.8 D	0.0	0.0	0.0	0.0	0.0
GE-77	11.30 H	1.34E 00	6.88E-01	3.90E-01	7.47E-01	1.30E 00
AS-72	2[illegible] H	2.23E 00	1.48E 00	1.01E 00	1.53E 00	2.20E 00
AS-73	80.30 D	0.0	0.0	0.0	0.0	0.0
AS-74	17.77 D	5.23E-01	1.63E-01	5.64E-02	2.05E-01	5.00E-01
AS-76	26.32 H	2.30E 00	1.52E 00	1.04E 00	1.57E 00	2.27E 00
AS-77	38.8 H	3.83E-01	3.35E-02	1.55E-03	8.65E-02	3.50E-01
SE-73	7.15 H	7.63E-01	2.93E-01	1.10E-01	3.41E-01	7.38E-01
SE-75	119.78 D	5.67E-03	0.0	0.0	1.35E-03	4.01E-03
SE-79	6.5E4 Y	1.69E-02	0.0	0.0	1.33E-03	7.97E-03
BR-77	57.04 H	4.02E-03	2.31E-07	0.0	1.00E-03	3.23E-03
BR-80	17.4 M	1.52E 00	8.31E-01	4.73E-01	8.86E-01	1.49E 00
BR-80M	4.42 H	0.0	0.0	0.0	0.0	0.0
BR-82	35.30 H	1.79E-01	1.07E-03	1.52E-08	3.06E-02	1.52E-01
BR-83	2.39 H	5.90E-01	1.18E-01	2.06E-02	1.81E-01	5.55E-01
BR-84	31.80 M	2.73E 00	1.96E 00	1.50E 00	2.01E 00	2.70E 00
BR-85	172 S	2.15E 00	1.36E 00	8.91E-01	1.41E 00	2.12E 00
KR-79	35.04 H	3.32E-02	2.05E-03	3.43E-05	6.91E-03	3.04E-02

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
H-3	12.28 Y	0.0	0.0	0.0	0.0	0.0
BE-7	53.44 D	0.0	0.0	0.0	0.0	0.0
BE-10	1.6E6 Y	3.20E-01	1.12E-02	5.33E-05	6.08E-02	2.86E-01
C-11	20.48 M	7.40E-01	1.74E-01	3.54E-02	2.45E-01	7.02E-01
C-14	5.73E3 Y	1.26E-02	0.0	0.0	1.10E-03	5.88E-03
N-13	9.97 M	9.80E-01	3.36E-01	1.11E-01	4.06E-01	9.44E-01
N-16	7.13 S	6.10E 00	5.14E 00	4.39E 00	5.18E 00	6.07E 00
O-15	122.24 S	1.53E 00	7.83E-01	4.07E-01	8.45E-01	1.50E 00
F-18	109.74 M	4.17E-01	2.90E-02	6.92E-04	8.90E-02	3.81E-01
NA-22	2.602 Y	3.18E-01	1.16E-02	8.29E-04	6.09E-02	2.85E-01
NA-24	15.00 H	1.12E 00	4.54E-01	1.86E-01	5.20E-01	1.08E 00
MG-27	9.458 M	1.45E 00	7.28E-01	3.74E-01	7.90E-01	1.42E 00
MG-28	20.91 H	2.10E-01	2.01E-03	3.11E-05	3.63E-02	1.80E-01
AL-26	7.2E5 Y	7.97E-01	2.67E-01	8.53E-02	3.25E-01	7.67E-01
AL-28	2.240 M	2.69E 00	1.84E 00	1.29E 00	1.89E 00	2.66E 00
SI-31	157.3 M	1.21E 00	5.31E-01	2.36E-01	5.95E-01	1.17E 00
SI-32	3.3E2 Y	3.51E-02	0.0	0.0	5.45E-03	2.21E-02
P-32	14.29 D	1.43E 00	7.17E-01	3.66E-01	7.78E-01	1.40E 00
P-33	25.4 D	5.54E-02	0.0	0.0	1.13E-02	3.86E-02
S-35	87.44 D	1.48E-02	0.0	0.0	1.46E-03	7.54E-03
CL-36	3.01E5 Y	4.29E-01	4.31E-02	2.42E-03	1.01E-01	3.94E-01
CL-38	37.21 M	3.30E 00	2.56E 00	2.04E 00	2.61E 00	3.35E 00
AR-37	35.02 D	0.0	0.0	0.0	0.0	0.0
AR-39	269 Y	3.63E-01	1.81E-02	1.34E-04	7.26E-02	3.29E-01
AR-41	1.827 H	9.14E-01	3.10E-01	1.05E-01	3.77E-01	8.78E-01
K-40	1.277E9 Y	9.06E-01	3.41E-01	1.28E-01	4.03E-01	8.74E-01
K-42	12.36 H	3.13E 00	2.27E 00	1.70E 00	2.32E 00	3.10E 00
K-43	22.6 H	5.55E-01	1.02E-01	1.98E-02	1.64E-01	5.20E-01
CA-41	1.03E5 Y	0.0	0.0	0.0	0.0	0.0
CA-45	162.7 D	5.73E-02	0.0	0.0	1.23E-02	4.04E-02
CA-47	4.536 D	6.44E-01	2.03E-01	1.01E-01	2.59E-01	6.10E-01
CA-49	8.719 M	1.84E 00	1.08E 00	6.54E-01	1.13E 00	1.81E 00
SC-44	3.927 H	1.23E 00	5.47E-01	2.43E-01	6.10E-01	1.19E 00
SC-46	83.80 D	1.25E-01	5.21E-05	8.04E-06	2.09E-02	1.01E-01
SC-46M	18.72 S	5.74E-02	0.0	0.0	4.10E-03	4.09E-02
SC-47	3.422 D	2.33E-01	6.00E-03	7.07E-05	4.32E-02	2.05E-01
SC-48	43.67 H	3.62E-01	2.56E-02	8.11E-04	7.76E-02	3.29E-01
SC-49	57.4 M	1.73E 00	9.71E-01	5.62E-01	1.03E 00	1.69E 00
TI-44	47.3 Y	2.87E-04	0.0	0.0	3.73E-06	6.89E-06
TI-45	3.08 H	7.33E-01	2.05E-01	5.15E-02	2.68E-01	7.01E-01
TI-51	5.752 M	1.82E 00	1.06E 00	6.35E-01	1.12E 00	1.79E 00
V-48	15.971 D	2.64E-01	2.76E-02	1.42E-03	6.27E-02	2.45E-01
V-49	330 D	0.0	0.0	0.0	0.0	0.0
V-52	3.75 M	2.29E 00	1.48E 00	9.83E-01	1.53E 00	2.26E 00
CR-49	42.09 M	1.22E 00	5.52E-01	2.49E-01	6.14E-01	1.19E 00
CR-51	27.704 D	0.0	0.0	0.0	0.0	0.0
MN-52	5.591 D	1.21E-01	5.64E-03	4.59E-05	2.40E-02	1.10E-01
MN-52M	21.4 M	2.44E 00	1.62E 00	1.10E 00	1.67E 00	2.41E 00
MN-53	3.7E6 Y	0.0	0.0	0.0	0.0	0.0

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
CM-247	1.56E7 Y	5.62E-01	3.36E-01	3.37E-01	4.97E-01	3.74E-01	4.63E-01	3.00E-01	3.95E-01
CM-248	3.39E5 Y	5.67E-04	1.29E-05	1.35E-05	8.29E-05	1.51E-05	3.06E-05	7.87E-06	7.60E-05
CM-249	64.15 M	3.46E-02	2.05E-02	2.08E-02	3.02E-02	2.32E-02	2.82E-02	1.83E-02	2.41E-02
CM-250	6.9E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-249	320 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-250	3.222 H	1.70E 00	1.01E 00	1.03E 00	1.47E 00	1.18E 00	1.40E 00	9.13E-01	1.18E 00
BK-251	57.0 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CF-248	333.5 D	6.57E-04	7.78E-06	8.28E-06	9.24E-05	5.20E-06	2.36E-05	2.08E-06	8.46E-05
CF-249	350.6 Y	5.82E-01	3.47E-01	3.48E-01	5.14E-01	3.87E-01	4.80E-01	3.10E-01	4.08E-01
CF-250	13.08 Y	6.80E-04	2.65E-05	2.71E-05	1.22E-04	3.02E-05	5.51E-05	1.87E-05	1.07E-04
CF-251	9.0E2 Y	2.00E-01	1.16E-01	1.16E-01	1.81E-01	1.39E-01	1.77E-01	1.02E-01	1.42E-01
CF-252	2.639 Y	6.27E-04	1.94E-05	2.00E-05	1.06E-04	2.18E-05	4.32E-05	1.27E-05	9.38E-05
CF-253	17.81 D	1.11E-05	1.43E-07	1.50E-07	1.55E-06	8.94E-08	3.99E-07	4.64E-08	1.43E-06
CF-254	60.5 D	2.93E-08	7.91E-09	8.59E-09	2.27E-08	1.52E-08	1.98E-08	6.52E-09	1.55E-08
ES-253	20.467 D	8.91E-04	3.08E-04	3.06E-04	5.11E-04	3.49E-04	4.52E-04	2.71E-04	4.10E-04
ES-254	275.7 D	1.31E-02	2.54E-03	2.58E-03	5.34E-03	3.18E-03	4.26E-03	2.17E-03	4.26E-03
ES-254M	39.3 H	1.05E 00	6.18E-01	6.28E-01	9.07E-01	7.05E-01	8.53E-01	5.53E-01	7.27E-01
ES-255	39.8 D	4.93E-05	6.71E-07	7.18E-07	7.42E-06	5.06E-07	2.04E-06	2.01E-07	6.64E-06
FM-254	3.240 H	7.64E-04	4.29E-05	4.37E-05	1.66E-04	4.91E-05	8.54E-05	3.15E-05	1.40E-04
FM-255	20.07 H	8.16E-03	1.43E-03	1.46E-03	3.31E-03	1.92E-03	2.64E-03	1.20E-03	2.60E-03
FM-256	157.6 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
CM-247	1.56E7 Y	3.55E-01	3.42E-01	3.68E-01	4.45E-01	3.79E-01	3.21E-01	2.95E-01	4.53E-01
CM-248	3.39E5 Y	1.27E-05	1.15E-05	2.11E-05	3.11E-05	9.27E-06	1.37E-05	1.22E-05	3.70E-05
CM-249	64.15 M	2.20E-02	2.10E-02	2.25E-02	2.57E-02	2.30E-02	2.02E-02	1.81E-02	2.61E-02
CM-250	6.9E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-249	320 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-250	3.222 H	1.10E 00	1.05E 00	1.11E 00	1.19E 00	1.12E 00	1.01E 00	9.03E-01	1.21E 00
BK-251	57.0 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CF-248	333.5 D	5.79E-06	4.40E-06	1.64E-05	2.04E-05	5.85E-06	9.69E-06	9.57E-06	2.74E-05
CF-249	350.6 Y	3.66E-01	3.52E-01	3.80E-01	4.66E-01	3.90E-01	3.29E-01	3.04E-01	4.74E-01
CF-250	13.08 Y	2.49E-05	2.42E-05	3.80E-05	5.81E-05	2.08E-05	2.60E-05	2.35E-05	6.61E-05
CF-251	9.0E2 Y	1.20E-01	1.17E-01	1.29E-01	1.95E-01	1.17E-01	1.02E-01	9.67E-02	2.00E-01
CF-252	2.639 Y	1.81E-05	1.72E-05	2.96E-05	4.45E-05	1.46E-05	1.97E-05	1.77E-05	5.17E-05
CF-253	17.81 D	8.69E-08	8.23E-08	2.86E-07	3.61E-07	1.11E-07	1.71E-07	1.71E-07	4.81E-07
CF-254	60.5 D	1.44E-08	9.90E-09	1.09E-08	1.96E-08	4.76E-09	7.95E-09	5.44E-09	2.00E-08
ES-253	20.467 D	3.17E-04	3.07E-04	3.41E-04	4.71E-04	3.35E-04	2.73E-04	2.67E-04	4.86E-04
ES-254	275.7 D	2.77E-03	2.62E-03	3.02E-03	4.52E-03	2.42E-03	2.34E-03	2.10E-03	4.71E-03
ES-254M	39.3 H	6.66E-01	6.35E-01	6.80E-01	7.57E-01	6.93E-01	6.16E-01	5.47E-01	7.69E-01
ES-255	39.8 D	5.66E-07	4.15E-07	1.37E-06	1.76E-06	4.93E-07	8.24E-07	7.88E-07	2.30E-06
FM-254	3.240 H	4.11E-05	3.99E-05	5.82E-05	9.06E-05	3.51E-05	4.09E-05	3.71E-05	1.01E-04
FM-255	20.07 H	1.58E-03	1.49E-03	1.76E-03	2.95E-03	1.15E-03	1.30E-03	1.11E-03	3.09E-03
FM-256	157.6 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
CM-247	1.56E7 Y	3.68E-01	3.44E-01	3.79E-01	4.78E-01	3.35E-01	3.01E-01	3.55E-01	3.30E-01
CM-248	3.39E5 Y	1.88E-05	1.12E-05	1.12E-05	3.41E-04	1.06E-05	8.44E-06	9.80E-06	1.37E-05
CM-249	64.15 M	2.22E-02	2.11E-02	2.36E-02	2.79E-02	2.07E-02	1.87E-02	2.20E-02	2.03E-02
CM-250	6.9E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-249	320 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-250	3.222 H	1.08E 00	1.05E 00	1.18E 00	1.32E 00	1.04E 00	9.46E-01	1.11E 00	1.02E 00
BK-251	57.0 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CF-248	333.5 D	1.55E-05	3.80E-06	4.26E-06	3.98E-04	4.82E-06	2.71E-06	3.04E-06	9.71E-06
CF-249	350.6 Y	3.80E-01	3.54E-01	3.89E-01	5.00E-01	3.46E-01	3.10E-01	3.66E-01	3.41E-01
CF-250	13.08 Y	3.46E-05	2.32E-05	2.51E-05	4.28E-04	2.35E-05	1.89E-05	2.24E-05	2.71E-05
CF-251	9.0E2 Y	1.27E-01	1.18E-01	1.25E-01	2.04E-01	1.15E-01	1.01E-01	1.23E-01	1.13E-01
CF-252	2.639 Y	2.67E-05	1.64E-05	1.76E-05	3.91E-04	1.66E-05	1.31E-05	1.52E-05	2.02E-05
CF-253	17.81 D	2.72E-07	6.39E-08	9.05E-08	6.71E-06	9.70E-08	5.49E-08	5.79E-08	1.75E-07
CF-254	60.5 D	8.32E-09	1.17E-08	7.37E-09	2.98E-08	6.69E-09	7.12E-09	9.19E-09	7.29E-09
ES-253	20.467 D	3.45E-04	3.07E-04	3.29E-04	7.23E-04	3.01E-04	2.67E-04	3.17E-04	3.03E-04
ES-254	275.7 D	2.83E-03	2.64E-03	2.71E-03	9.77E-03	2.45E-03	2.18E-03	2.58E-03	2.47E-03
ES-254M	39.3 H	6.68E-01	6.39E-01	7.17E-01	8.27E-01	6.28E-01	5.66E-01	6.68E-01	6.15E-01
ES-255	39.8 D	1.27E-06	3.72E-07	3.82E-07	3.02E-05	4.24E-07	2.59E-07	2.96E-07	8.18E-07
FM-254	3.240 H	5.34E-05	3.83E-05	4.17E-05	5.03E-04	3.90E-05	3.18E-05	3.82E-05	4.33E-05
FM-255	20.07 H	1.56E-03	1.50E-03	1.51E-03	6.33E-03	1.37E-03	1.20E-03	1.45E-03	1.36E-03
FM-256	157.6 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
NP-240	65 M	2.16E 00	1.28E 00	1.30E 00	1.87E 00	1.47E 00	1.78E 00	1.15E 00	1.50E 00
NP-240M	7.4 M	6.13E-01	3.63E-01	3.69E-01	5.32E-01	4.13E-01	4.99E-01	3.27E-01	4.27E-01
PU-236	2.851 Y	9.66E-04	3.98E-05	4.13E-05	1.61E-04	5.45E-05	8.38E-05	3.02E-05	1.44E-04
PU-237	45.3 D	8.30E-02	4.51E-02	4.51E-02	7.46E-02	5.71E-02	7.39E-02	3.91E-02	5.74E-02
PU-238	87.75 Y	8.27E-04	2.03E-05	2.12E-05	1.14E-04	2.61E-05	4.62E-05	1.35E-05	1.07E-04
PU-239	24131 Y	3.93E-04	5.62E-05	5.60E-05	1.17E-04	6.73E-05	9.15E-05	4.76E-05	9.85E-05
PU-240	6537 Y	7.92E-04	2.10E-05	2.20E-05	1.13E-04	2.78E-05	4.80E-05	1.43E-05	1.05E-04
PU-241	14.4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PU-242	3.758E5 Y	6.60E-04	1.92E-05	2.00E-05	9.67E-05	2.54E-05	4.27E-05	1.34E-05	8.90E-05
PU-243	4.956 H	4.03E-02	2.15E-02	2.17E-02	3.67E-02	2.84E-02	3.62E-02	1.88E-02	2.79E-02
PU-244	8.26E7 Y	5.56E-04	7.73E-06	8.18E-06	6.78E-05	9.28E-06	2.06E-05	4.04E-06	6.51E-05
PU-245	10.57 H	7.65E-01	4.55E-01	4.60E-01	6.71E-01	5.20E-01	6.35E-01	4.07E-01	5.35E-01
PU-246	10.85 D	1.68E-01	9.55E-02	9.52E-02	1.50E-01	1.13E-01	1.43E-01	8.45E-02	1.17E-01
AM-241	432.2 Y	3.00E-02	1.48E-02	1.54E-02	3.11E-02	2.30E-02	2.97E-02	1.26E-02	2.27E-02
AM-242	16.02 H	2.49E-02	1.30E-02	1.29E-02	2.13E-02	1.62E-02	2.10E-02	1.12E-02	1.65E-02
AM-242M	152 Y	2.81E-03	2.45E-04	2.49E-04	6.95E-04	3.07E-04	4.52E-04	1.96E-04	5.83E-04
AM-243	7.38E3 Y	9.08E-02	4.43E-02	4.52E-02	8.14E-02	6.31E-02	8.04E-02	3.88E-02	6.09E-02
AM-244	10.1 H	1.52E 00	8.93E-01	9.10E-01	1.31E 00	1.03E 00	1.24E 00	8.00E-01	1.05E 00
AM-245	122.4 M	5.37E-02	3.15E-02	3.14E-02	4.86E-02	3.70E-02	4.71E-02	2.78E-02	3.80E-02
AM-246	25.0 M	1.86E 00	1.11E 00	1.13E 00	1.61E 00	1.29E 00	1.53E 00	1.00E 00	1.30E 00
CM-242	163.2 D	9.00E-04	2.12E-05	2.21E-05	1.32E-04	2.46E-05	4.92E-05	1.33E-05	1.21E-04
CM-243	28.5 Y	2.19E-01	1.27E-01	1.27E-01	1.97E-01	1.50E-01	1.91E-01	1.12E-01	1.54E-01
CM-244	18.11 Y	7.96E-04	1.55E-05	1.61E-05	1.11E-04	1.67E-05	3.74E-05	8.78E-06	1.03E-04
CM-245	8.5E3 Y	1.22E-01	6.86E-02	6.83E-02	1.10E-01	8.41E-02	1.08E-01	5.98E-02	8.52E-02
CM-246	4.75E3 Y	7.04E-04	9.50E-06	1.01E-05	9.29E-05	9.48E-06	2.64E-05	4.11E-06	8.70E-05

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ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
NB-94M	6.26 M	4.09E-03	1.36E-03	4.48E-04	1.66E-03	3.93E-03
NB-95	35.06 D	1.23E-02	9.66E-04	3.32E-04	2.75E-03	6.88E-03
NB-95M	86.6 H	2.96E-01	1.64E-02	5.46E-03	6.11E-02	2.63E-01
NB-96	23.35 H	4.34E-01	5.08E-02	4.07E-03	1.07E-01	4.00E-01
NB-97	72.1 M	9.22E-01	3.26E-01	1.16E-01	3.90E-01	8.87E-01
NB-97M	60 S	2.96E-02	1.35E-02	4.41E-03	1.47E-02	2.90E-02
MO-91	15.49 M	3.18E 00	2.33E 00	1.75E 00	2.38E 00	3.15E 00
MO-93	3.5E3 Y	0.0	0.0	0.0	0.0	0.0
MO-99	66.02 H	7.56E-01	2.39E-01	7.84E-02	2.98E-01	7.21E-01
MO-101	14.61 M	1.05E 00	4.70E-01	2.59E-01	5.31E-01	1.01E 00
TC-95	20.0 H	1.86E-03	8.74E-04	3.06E-04	9.44E-04	1.82E-03
TC-95M	61 D	1.18E-02	2.90E-04	1.94E-05	2.16E-03	1.01E-02
TC-96	4.28 D	1.95E-03	9.33E-04	3.39E-04	1.00E-03	1.91E-03
TC-96M	51.5 M	0.0	0.0	0.0	0.0	0.0
TC-97	2.6E6 Y	0.0	0.0	0.0	0.0	0.0
TC-97M	89 D	2.20E-02	0.0	0.0	6.07E-04	5.43E-03
TC-98	4.2E6 Y	1.46E-01	2.34E-03	5.53E-04	2.59E-02	1.21E-01
TC-99	2.13E5 Y	7.28E-02	1.38E-08	0.0	1.92E-02	5.42E-02
TC-99M	6.02 H	1.22E-02	0.0	0.0	8.42E-04	7.70E-03
TC-101	14.2 M	9.33E-01	3.34E-01	1.23E-01	3.98E-01	8.98E-01
RU-97	2.9 D	1.05E-02	1.73E-06	0.0	2.62E-03	9.01E-03
RU-103	39.35 D	5.09E-02	2.21E-03	9.50E-05	9.97E-03	3.81E-02
RU-105	4.44 H	7.75E-01	2.32E-01	7.05E-02	2.96E-01	7.40E-01
RU-106	368.2 D	0.0	0.0	0.0	0.0	0.0
RH-103M	56.119 M	0.0	0.0	0.0	0.0	0.0
RH-105	35.36 H	2.19E-01	7.31E-03	4.69E-05	4.14E-02	1.92E-01
RH-105M	45 S	8.16E-02	0.0	0.0	4.74E-03	4.75E-02
RH-106	29.92 S	3.09E 00	2.23E 00	1.66E 00	2.28E 00	3.06E 00
PD-103	16.961 D	0.0	0.0	0.0	0.0	0.0
PD-107	6.5E6 Y	0.0	0.0	0.0	0.0	0.0
PD-109	13.453 H	6.82E-01	1.70E-01	4.01E-02	2.34E-01	6.47E-01
AG-106M	8.46 D	5.82E-03	9.43E-04	1.09E-05	1.60E-03	5.49E-03
AG-108	2.37 M	1.25E 00	5.87E-01	2.86E-01	6.47E-01	1.21E 00
AG-108M	127 Y	1.13E-02	2.74E-03	4.59E-04	3.79E-03	1.09E-02
AG-109M	39.6 S	1.37E-02	0.0	0.0	2.82E-04	2.33E-03
AG-110	24.57 S	2.56E 00	1.73E 00	1.21E 00	1.78E 00	2.53E 00
AG-110M	249.85 D	7.84E-02	3.03E-03	2.50E-04	1.51E-02	6.87E-02
AG-111	7.46 D	6.58E-01	1.59E-01	3.69E-02	2.22E-01	6.23E-01
CD-109	464 D	0.0	0.0	0.0	0.0	0.0
CD-111M	48.7 M	1.18E-01	0.0	0.0	2.33E-02	8.54E-02
CD-113	9.3E15 Y	8.97E-02	1.77E-06	0.0	2.24E-02	6.92E-02
CD-113M	13.7 Y	2.87E-01	1.21E-02	1.19E-04	5.59E-02	2.56E-01
CD-115	53.46 H	5.73E-01	1.36E-01	3.66E-02	1.92E-01	5.39E-01
CD-115M	44.6 D	1.24E 00	5.72E-01	2.74E-01	6.33E-01	1.20E 00
CD-117	2.49 H	8.39E-01	3.85E-01	2.18E-01	4.33E-01	8.07E-01
CD-117M	3.36 H	3.29E-01	4.49E-02	1.44E-02	8.72E-02	3.00E-01
IN-111	2.83 D	3.89E-02	0.0	0.0	7.69E-03	3.19E-02
IN-113M	1.658 H	2.46E-01	1.18E-02	0.0	6.64E-02	2.32E-01
IN-114	71.9 S	1.61E 00	8.87E-01	5.05E-01	9.44E-01	1.58E 00

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
IN-114M	49.51 D	1.95E-01	0.0	0.0	3.34E-03	1.59E-01
IN-115	4.6E15 Y	2.14E-01	3.15E-03	1.11E-06	3.77E-02	1.85E-01
IN-115M	4.36 H	3.03E-01	4.65E-03	4.45E-04	5.37E-02	2.82E-01
IN-116M	54.15 M	5.49E-01	1.13E-01	2.26E-02	1.71E-01	5.15E-01
IN-117	43.8 M	4.45E-01	4.84E-02	3.54E-03	1.07E-01	4.05E-01
IN-117M	116.5 M	8.61E-01	3.49E-01	1.77E-01	4.06E-01	8.31E-01
SN-113	115.1 D	0.0	0.0	0.0	0.0	0.0
SN-117M	13.60 D	1.62E-01	0.0	0.0	1.43E-02	1.13E-01
SN-119M	293.0 D	2.47E-04	0.0	0.0	1.10E-06	0.0
SN-123	129.2 D	1.08E 00	4.55E-01	1.97E-01	5.16E-01	1.04E 00
SN-125	9.64 D	1.74E 00	1.07E 00	6.89E-01	1.12E 00	1.71E 00
SN-126	1.0E5 Y	4.92E-02	0.0	0.0	1.01E-02	3.28E-02
SB-117	2.80 H	2.65E-02	3.55E-04	2.30E-06	4.65E-03	1.99E-02
SB-122	2.70 D	1.15E 00	5.26E-01	2.58E-01	5.84E-01	1.12E 00
SB-124	60.20 D	7.30E-01	3.19E-01	1.84E-01	3.65E-01	7.00E-01
SB-125	2.77 Y	1.01E-01	4.03E-03	8.54E-05	1.95E-02	8.56E-02
SB-126	12.4 D	5.53E-01	1.91E-01	9.00E-02	2.35E-01	5.23E-01
SB-126M	19.0 M	1.22E 00	6.07E-01	3.17E-01	6.61E-01	1.19E 00
SB-127	3.85 D	5.75E-01	1.25E-01	2.93E-02	1.94E-01	5.41E-01
SB-129	4.40 H	6.78E-01	2.48E-01	1.21E-01	2.99E-01	6.46E-01
TE-121	16.8 D	5.22E-03	1.39E-03	7.61E-05	1.81E-03	5.03E-03
TE-121M	154 D	2.61E-02	0.0	0.0	2.97E-04	1.65E-02
TE-123	1E13 Y	0.0	0.0	0.0	0.0	0.0
TE-123M	119.7 D	3.53E-02	0.0	0.0	3.12E-03	1.69E-02
TE-125M	58 D	4.02E-02	0.0	0.0	1.56E-03	1.67E-02
TE-127	9.35 H	3.71E-01	3.23E-02	1.52E-03	8.37E-02	3.39E-01
TE-127M	109 D	2.18E-02	1.07E-03	7.81E-05	4.36E-03	1.00E-02
TE-129	69.6 M	1.05E 00	4.29E-01	1.81E-01	4.91E-01	1.02E 00
TE-129M	33.6 D	4.64E-01	2.06E-01	1.02E-01	2.32E-01	4.39E-01
TE-131	25.0 M	1.46E 00	7.56E-01	4.22E-01	8.13E-01	1.42E 00
TE-131M	30 H	2.78E-01	5.70E-02	3.49E-02	9.02E-02	2.47E-01
TE-132	78.2 H	5.76E-02	0.0	0.0	1.00E-02	4.21E-02
TE-133	12.45 M	1.73E 00	9.93E-01	6.09E-01	1.05E 00	1.70E 00
TE-133M	55.4 M	1.45E 00	7.79E-01	4.54E-01	8.36E-01	1.42E 00
TE-134	41.8 M	1.55E-01	1.15E-03	1.72E-05	2.66E-02	1.28E-01
I-122	3.62 M	2.25E 00	1.58E 00	1.14E 00	1.62E 00	2.23E 00
I-123	13.13 H	2.13E-02	0.0	0.0	1.89E-03	1.45E-02
I-124	4.18 D	4.16E-01	2.31E-01	1.32E-01	2.45E-01	4.08E-01
I-125	60.14 D	0.0	0.0	0.0	0.0	0.0
I-126	12.93 D	2.45E-01	5.94E-02	1.63E-02	8.32E-02	2.31E-01
I-128	24.99 M	1.60E 00	8.97E-01	5.25E-01	9.52E-01	1.56E 00
I-129	1.57E7 Y	8.04E-03	0.0	0.0	6.62E-04	3.53E-03
I-130	12.36 H	5.13E-01	1.00E-01	2.21E-02	1.56E-01	4.80E-01
I-131	8.040 D	2.92E-01	1.38E-02	2.41E-04	5.79E-02	2.61E-01
I-132	2.30 H	9.74E-01	3.99E-01	1.89E-01	4.60E-01	9.39E-01
I-133	20.8 H	7.92E-01	2.55E-01	8.46E-02	3.16E-01	7.58E-01
I-134	52.6 M	1.24E 00	5.88E-01	3.00E-01	6.49E-01	1.21E 00
I-135	6.61 H	7.02E-01	2.25E-01	8.45E-02	2.81E-01	6.69E-01
I-136	83 S	4.53E 00	3.60E 00	2.91E 00	3.64E 00	4.51E 00

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ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
XE-122	20.1 H	2.14E-03	6.05E-06	0.0	5.37E-04	1.66E-03
XE-123	2.14 H	3.37E-01	1.41E-01	6.36E-02	1.61E-01	3.19E-01
XE-125	16.8 H	2.61E-02	6.52E-05	1.00E-07	4.39E-03	2.14E-0
XE-127	36.406 D	2.97E-02	3.73E-05	0.0	7.43E-03	2.34E-02
XE-129M	8.89 D	2.27E-01	0.0	0.0	3.04E-02	1.84E-01
XE-131M	11.84 D	1.56E-01	0.0	0.0	1.48E-02	1.13E-01
XE-133	5.245 D	1.05E-01	1.48E-05	0.0	2.63E-02	8.23E-02
XE-133M	2.19 D	2.92E-01	0.0	0.0	5.31E-02	2.52E-01
XE-135	9.11 H	5.75E-01	1.04E-01	1.73E-02	1.68E-01	5.38E-01
XE-135M	15.36 M	1.89E-01	4.33E-02	9.18E-04	6.06E-02	1.82E-01
XE-137	3.83 M	3.94E 00	3.03E 00	2.38E 00	3.07E 00	3.91E 00
XE-138	14.13 M	1.28E 00	7.07E-01	4.49E-01	7.59E-01	1.25E 00
CS-126	1.64 M	2.94E 00	2.19E 00	1.67E 00	2.23E 00	2.91E 00
CS-129	32.06 H	6.11E-03	1.98E-04	0.0	1.61E-03	5.74E-03
CS-131	9.688 D	0.0	0.0	0.0	0.0	0.0
CS-132	6.475 D	1.35E-02	2.83E-03	4.65E-04	4.21E-03	1.26E-02
CS-134	2.062 Y	2.55E-01	2.08E-02	1.35E-03	5.66E-02	2.31E-01
CS-134M	2.90 H	7.28E-02	0.0	0.0	4.49E-03	4.13E-02
CS-135	2.3E6 Y	2.57E-02	0.0	0.0	3.74E-03	1.56E-02
CS-136	13.16 D	1.41E-01	4.07E-03	1.59E-03	2.64E-02	1.12E-01
CS-137	30.17 Y	2.55E-01	1.74E-02	4.16E-03	5.49E-02	2.26E-01
CS-138	32.2 M	2.65E 00	1.82E 00	1.29E 00	1.87E 00	2.62E 00
CS-139	9.40 M	3.67E 00	2.78E 00	2.17E 00	2.83E 00	3.64E 00
BA-131	11.8 D	2.71E-02	8.41E-04	2.09E-06	5.08E-03	1.79E-02
BA-133	10.5 Y	1.55E-02	1.11E-04	0.0	3.91E-03	1.34E-02
BA-133M	38.9 H	3.46E-01	0.0	0.0	8.38E-02	3.11E-01
BA-135M	28.7 H	3.39E-01	0.0	0.0	7.82E-02	3.03E-01
BA-137M	2.552 M	1.29E-01	4.90E-02	9.61E-03	5.59E-02	1.26E-01
BA-139	83.1 M	1.91E 00	1.14E 00	7.04E-01	1.19E 00	1.87E 00
BA-140	12.789 D	4.96E-01	1.03E-01	2.28E-02	1.55E-01	4.63E-01
BA-141	18.27 M	1.80E 00	1.05E 00	6.57E-01	1.11E 00	1.76E 00
BA-142	10.70 M	8.92E-01	3.49E-01	1.64E-01	4.09E-01	8.57E-01
LA-140	40.22 H	1.07E 00	4.38E-01	1.91E-01	5.02E-01	1.03E 00
LA-141	3.94 H	2.02E 00	1.25E 00	8.01E-01	1.30E 00	1.99E 00
LA-142	95.4 M	1.80E 00	1.09E 00	7.16E-01	1.15E 00	1.77E 00
CE-139	137.66 D	2.69E-02	0.0	0.0	2.61E-03	1.84E-02
CE-141	32.50 D	2.16E-01	3.73E-03	2.74E-05	3.84E-02	1.80E-01
CE-143	33.0 H	8.04E-01	2.55E-01	8.83E-02	3.19E-01	7.68E-01
CE-144	284.3 D	7.48E-02	6.94E-07	0.0	1.87E-02	5.53E-02
PR-142	19.13 H	1.75E 00	1.03E 00	6.37E-01	1.09E 00	1.72E 00
PR-143	13.56 D	5.80E-01	1.13E-01	2.13E-02	1.79E-01	5.46E-01
PR-144	17.28 M	2.62E 00	1.80E 00	1.27E 00	1.85E 00	2.59E 00
PR-144M	7.2 M	1.63E-06	0.0	0.0	3.17E-10	0.0
ND-147	10.98 D	4.01E-01	5.26E-02	5.50E-03	1.03E-01	3.68E-01
ND-149	1.73 H	9.10E-01	3.16E-01	1.20E-01	3.83E-01	8.69E-01
PM-143	265 D	2.04E-03	8.87E-04	2.58E-04	9.73E-04	1.99E-03
PM-144	363 D	1.62E-02	4.92E-03	7.50E-04	6.10E-03	1.57E-02
PM-145	17.7 Y	5.61E-05	0.0	0.0	4.95E-07	7.26E-08
PM-146	2020 D	1.65E-01	2.25E-02	2.33E-03	4.29E-02	1.53E-01

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR
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NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
PM-147	2.6234 Y	3.41E-02	0.0	0.0	5.82E-03	2.20E-02
PM-148	5.37 D	1.52E 00	8.48E-01	5.20E-01	9.04E-01	1.48E 00
PM-148M	41.3 D	2.29E-01	1.45E-02	1.18E-03	4.79E-02	2.01E-01
PM-149	53.08 H	6.91E-01	1.80E-01	4.58E-02	2.43E-01	6.56E-01
PM-151	28.40 H	5.12E-01	9.94E-02	2.08E-02	1.55E-01	4.77E-01
SM-147	1.069E11 Y	0.0	0.0	0.0	0.0	0.0
SM-151	90 Y	0.0	0.0	0.0	0.0	0.0
SM-153	46.7 H	3.77E-01	3.48E-02	2.32E-03	8.64E-02	3.42E-01
EU-152	13.6 Y	1.76E-01	4.41E-02	1.69E-02	6.15E-02	1.60E-01
EU-152M	9.32 H	1.01E 00	5.18E-01	2.78E-01	5.60E-01	9.83E-01
EU-154	8.8 Y	4.09E-01	1.06E-01	4.81E-02	1.47E-01	3.71E-01
EU-155	4.96 Y	1.53E-02	0.0	0.0	3.06E-03	8.63E-03
EU-156	15.19 D	7.61E-01	3.86E-01	2.37E-01	4.23E-01	7.31E-01
GD-152	1.1E14 Y	0.0	0.0	0.0	0.0	0.0
GD-153	241.6 D	3.71E-03	0.0	0.0	1.23E-04	1.30E-03
GD-159	18.56 H	5.72E-01	1.18E-01	2.29E-02	1.78E-01	5.37E-01
GD-162	9.7 M	5.99E-01	1.26E-01	2.45E-02	1.88E-01	5.65E-01
TB-157	150 Y	0.0	0.0	0.0	0.0	0.0
TB-160	72.3 D	3.90E-01	6.39E-02	2.09E-02	1.11E-01	3.53E-01
TB-162	7.76 M	9.75E-01	3.72E-01	1.48E-01	4.35E-01	9.37E-01
DY-157	8.06 H	6.10E-03	4.77E-06	0.0	1.53E-03	5.58E-03
DY-165	2.334 H	8.64E-01	2.96E-01	1.04E-01	3.59E-01	8.29E-01
DY-166	81.6 H	1.43E-01	3.90E-04	3.24E-08	2.41E-02	1.18E-01
HO-166	26.80 H	1.41E 00	7.24E-01	3.89E-01	7.83E-01	1.37E 00
HO-166M	1.20E3 Y	1.11E-01	1.57E-02	5.19E-03	2.99E-02	9.23E-02
ER-169	9.40 D	1.02E-01	1.33E-05	0.0	2.55E-02	8.06E-02
ER-171	7.52 H	6.99E-01	1.78E-01	4.66E-02	2.43E-01	6.57E-01
TM-170	128.6 D	5.82E-01	1.20E-01	2.27E-02	1.80E-01	5.46E-01
TM-171	1.92 Y	3.92E-04	0.0	0.0	1.09E-05	4.38E-05
YB-169	31.97 D	6.06E-02	7.00E-07	0.0	1.51E-02	4.14E-02
YB-175	4.19 D	1.67E-01	1.48E-03	7.74E-08	2.88E-02	1.42E-01
LU-177	6.71 D	1.84E-01	2.39E-03	9.44E-07	3.22E-02	1.55E-01
LU-177M	160.10 D	1.67E-01	3.57E-04	0.0	4.20E-02	1.13E-01
HF-181	42.39 D	2.03E-01	2.47E-03	5.07E-06	3.55E-02	1.63E-01
TA-182	114.74 D	1.84E-01	3.91E-03	8.40E-04	3.34E-02	1.46E-01
W-181	120.95 D	0.0	0.0	0.0	0.0	0.0
W-185	75.1 D	1.59E-01	6.58E-04	0.0	4.01E-02	1.34E-01
W-187	23.83 H	4.82E-01	1.01E-01	3.19E-02	1.53E-01	4.47E-01
W-188	69.4 D	1.02E-01	1.73E-05	0.0	2.56E-02	8.08E-02
RE-182	64.0 H	9.50E-02	0.0	0.0	1.24E-04	6.11E-02
RE-182M	12.7 H	4.92E-02	1.57E-02	8.19E-03	2.00E-02	3.60E-02
RE-183	70 D	2.95E-02	0.0	0.0	4.94E-03	1.60E-02
RE-184	38.0 D	2.75E-02	3.09E-03	1.18E-03	6.83E-03	1.60E-02
RE-184M	169 D	3.50E-02	0.0	0.0	7.19E-03	1.77E-02
RE-186	90.64 H	6.22E-01	1.52E-01	3.72E-02	2.12E-01	5.87E-01
RE-187	4.7E10 Y	0.0	0.0	0.0	0.0	0.0
RE-188	16.98 H	1.62E 00	8.88E-01	5.14E-01	9.48E-01	1.58E 00
OS-185	93.6 D	1.15E-02	3.62E-03	4.67E-04	4.41E-03	1.09E-02
OS-186	2.0E15 Y	0.0	0.0	0.0	0.0	0.0

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ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
OS-190M	9.9 M	1.14E-01	7.67E-03	3.89E-04	2.42E-02	9.79E-02
OS-191	15.4 D	2.17E-02	0.0	0.0	1.46E-03	1.20E-02
OS-191M	13.03 H	1.38E-03	0.0	0.0	1.15E-05	9.59E-06
OS-193	30.0 H	6.56E-01	1.66E-01	4.38E-02	2.28E-01	6.20E-01
IR-190	11.78 D	7.60E-02	3.37E-03	8.48E-05	1.49E-02	6.36E-02
IR-190M	1.2 H	0.0	0.0	0.0	0.0	0.0
IR-190M	3.2 H	6.20E-03	0.0	0.0	3.51E-05	4.37E-03
IR-192	74.02 D	3.38E-01	1.64E-02	5.33E-04	6.73E-02	3.03E-01
IR-193M	11.9 D	5.10E-03	0.0	0.0	7.25E-05	2.56E-04
IR-194	19.15 H	1.71E 00	9.81E-01	5.91E-01	1.04E 00	1.58E 00
IR-194M	171 D	1.66E-01	1.06E-02	8.06E-04	3.48E-02	1.36E-01
PT-191	2.71 D	3.11E-02	1.23E-03	3.00E-06	6.01E-03	2.45E-02
PT-193	50 Y	0.0	0.0	0.0	0.0	0.0
PT-193M	4.33 D	1.01E-01	0.0	0.0	6.41E-03	6.51E-02
PT-195M	4.02 D	9.83E-02	0.0	0.0	5.67E-03	5.80E-02
PT-197	18.3 H	3.19E-01	1.97E-02	6.17E-04	6.63E-02	2.84E-01
PT-197M	94.4 M	4.76E-01	4.65E-03	5.88E-05	8.24E-02	4.38E-01
AU-194	39.5 H	4.98E-02	9.13E-03	3.76E-03	1.50E-02	4.66E-02
AU-195	183 D	5.51E-03	0.0	0.0	3.04E-04	1.73E-03
AU-195M	30.6 S	8.84E-02	1.42E-06	0.0	2.21E-02	7.50E-02
AU-196	6.183 D	4.25E-02	3.12E-04	0.0	1.07E-02	3.84E-02
AU-198	2.696 D	6.01E-01	1.20E-01	2.30E-02	1.84E-01	5.65E-01
AU-199	3.139 D	1.30E-01	1.47E-04	3.89E-10	2.18E-02	9.74E-02
HG-197	64.14 H	2.23E-03	0.0	0.0	8.95E-05	2.65E-04
HG-197M	23.8 H	2.05E-01	0.0	0.0	4.64E-02	1.48E-01
HG-203	46.60 D	1.04E-01	0.0	0.0	2.56E-02	8.34E-02
TL-200	26.1 H	4.56E-02	7.49E-03	3.23E-03	1.31E-02	4.30E-02
TL-201	73.06 H	1.24E-02	0.0	0.0	1.21E-03	7.02E-03
TL-202	12.23 D	2.48E-02	1.66E-03	0.0	7.01E-03	2.34E-02
TL-204	3.779 Y	4.59E-01	6.50E-02	6.12E-03	1.21E-01	4.26E-01
TL-207	4.77 M	9.85E-01	3.84E-01	1.55E-01	4.46E-01	9.51E-01
TL-208	3.053 M	1.19E 00	5.18E-01	2.45E-01	5.85E-01	1.15E 00
TL-209	2.20 M	1.40E 00	6.91E-01	3.62E-01	7.55E-01	1.37E 00
TL-210	1.30 M	1.43E 00	6.98E-01	3.77E-01	7.67E-01	1.39E 00
PB-203	52.02 H	7.86E-02	1.42E-05	0.0	1.97E-02	6.86E-02
PB-204M	66.9 M	2.01E-01	9.00E-02	4.08E-02	1.00E-01	1.96E-01
PB-205	1.51E7 Y	0.0	0.0	0.0	0.0	0.0
PB-209	3.253 H	3.15E-01	1.95E-02	5.10E-04	6.56E-02	2.84E-01
PB-210	22.26 Y	0.0	0.0	0.0	0.0	0.0
PB-211	36.1 M	8.97E-01	3.28E-01	1.26E-01	3.89E-01	8.62E-01
PB-212	10.643 H	1.98E-01	9.07E-04	6.34E-06	3.36E-02	1.58E-01
PB-214	26.8 M	4.68E-01	3.75E-02	3.56E-03	1.04E-01	4.25E-01
BI-206	6.243 D	1.79E-01	2.82E-02	5.72E-03	4.96E-02	1.61E-01
BI-207	33.4 Y	2.20E-01	1.23E-01	6.52E-02	1.30E-01	2.16E-01
BI-208	3.68E5 Y	9.05E-03	7.44E-03	6.17E-03	7.49E-03	9.02E-03
BI-210	5.013 D	7.49E-01	2.20E-01	6.51E-02	2.82E-01	7.14E-01
BI-211	2.13 M	1.69E-02	9.41E-05	2.18E-07	2.87E-03	1.54E-02
BI-212	60.55 M	9.66E-01	5.35E-01	3.17E-01	5.70E-01	9.45E-01
BI-213	45.65 M	8.58E-01	2.87E-01	1.07E-01	3.52E-01	8.22E-01

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
BI-214	19.9 M	1.33E 00	6.89E-01	4.02E-01	7.49E-01	1.30E 00
PO-209	102 Y	3.08E-04	0.0	0.0	3.68E-08	2.50E-04
PO-210	138.378 D	0.0	0.0	0.0	0.0	0.0
PO-211	0.516 S	0.0	0.0	0.0	0.0	0.0
PO-212	2.98E-7 S	0.0	0.0	0.0	0.0	0.0
PO-213	4.2E-6 S	0.0	0.0	0.0	0.0	0.0
PO-214	1.637E-4 S	0.0	0.0	0.0	0.0	0.0
PO-215	1.778E-3 S	0.0	0.0	0.0	0.0	0.0
PO-216	0.146 S	0.0	0.0	0.0	0.0	0.0
PO-218	3.05 M	0.0	0.0	0.0	0.0	0.0
AT-211	7.214 H	1.20E-06	0.0	0.0	9.41E-10	0.0
AT-217	0.0323 S	0.0	0.0	0.0	0.0	0.0
RN-218	0.035 S	0.0	0.0	0.0	0.0	0.0
RN-219	3.96 S	9.58E-03	5.43E-05	0.0	2.42E-03	8.44E-03
RN-220	55.61 S	0.0	0.0	0.0	0.0	0.0
RN-222	3.8235 D	0.0	0.0	0.0	0.0	0.0
FR-221	4.8 M	1.15E-02	0.0	0.0	1.85E-03	9.30E-03
FR-223	21.8 M	6.54E-01	1.60E-01	3.98E-02	2.22E-01	6.16E-01
RA-222	38.0 S	1.20E-03	1.33E-06	0.0	3.01E-04	1.09E-03
RA-223	11.434 D	6.11E-02	4.23E-05	0.0	1.53E-02	4.97E-02
RA-224	3.62 D	3.19E-03	0.0	0.0	5.96E-04	2.71E-03
RA-225	14.8 D	9.13E-02	1.08E-05	0.0	2.28E-02	7.10E-02
RA-226	1600 Y	4.08E-03	0.0	0.0	4.90E-04	3.19E-03
RA-228	5.75 Y	0.0	0.0	0.0	0.0	0.0
AC-225	10.0 D	1.68E-03	0.0	0.0	1.13E-04	5.26E-04
AC-227	21.773 Y	0.0	0.0	0.0	0.0	0.0
AC-228	6.13 H	7.27E-01	2.49E-01	1.05E-01	3.04E-01	6.89E-01
TH-226	30.9 M	9.62E-03	0.0	0.0	3.79E-04	3.64E-03
TH-227	18.718 D	1.74E-02	6.86E-08	0.0	4.36E-03	1.43E-02
TH-228	1.9132 Y	1.39E-03	0.0	0.0	2.36E-05	1.26E-04
TH-229	7.34E3 Y	2.90E-02	0.0	0.0	4.26E-03	1.75E-02
TH-230	7.7E4 Y	4.39E-05	0.0	0.0	2.21E-07	0.0
TH-231	25.52 H	6.44E-02	6.91E-08	0.0	1.61E-02	4.62E-02
TH-232	1.405E10 Y	7.58E-05	0.0	0.0	2.71E-06	3.68E-05
TH-233	22.3 M	7.79E-01	2.41E-01	7.79E-02	3.04E-01	7.44E-01
TH-234	24.10 D	1.54E-02	0.0	0.0	1.92E-03	7.92E-03
PA-230	17.4 D	3.46E-02	1.48E-03	3.11E-05	6.76E-03	3.04E-02
PA-231	3.276E4 Y	9.17E-03	2.20E-06	0.0	2.29E-03	7.78E-03
PA-233	27.0 D	1.96E-01	6.82E-05	0.0	4.90E-02	1.63E-01
PA-234	6.70 H	6.33E-01	7.39E-02	1.58E-02	1.57E-01	5.34E-01
PA-234M	1.17 M	1.75E 00	1.02E 00	6.16E-01	1.07E 00	1.72E 00
U-230	20.8 D	4.25E-04	0.0	0.0	2.65E-05	1.43E-04
U-231	4.2 D	8.93E-04	0.0	0.0	1.49E-05	6.95E-05
U-232	72 Y	1.36E-04	0.0	0.0	5.22E-06	7.04E-05
U-233	1.592E5 Y	2.25E-05	0.0	0.0	2.71E-07	1.13E-06
U-234	2.445E5 Y	8.21E-05	0.0	0.0	2.55E-06	3.44E-05
U-235	7.038E8 Y	7.47E-03	0.0	0.0	1.01E-03	4.96E-03
U-236	2.3415E7 Y	6.39E-05	0.0	0.0	1.54E-06	1.90E-05
U-237	6.75 D	1.09E-01	0.0	0.0	2.26E-02	7.29E-02

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
U-238	4.468E9 Y	5.04E-05	0.0	0.0	1.10E-06	1.26E-05
U-239	23.40 M	7.68E-01	2.37E-01	7.50E-02	2.98E-01	7.33E-01
U-240	14.1 H	1.57E-01	6.85E-04	0.0	3.96E-02	1.32E-01
NP-235	396.1 D	2.34E-06	0.0	0.0	2.15E-08	3.69E-08
NP-236	1.15E6 Y	1.13E-01	2.38E-06	0.0	2.83E-02	7.08E-02
NP-236M	22.5 H	1.08E-01	2.75E-03	2.49E-05	1.99E-02	9.44E-02
NP-237	2.14E6 Y	2.99E-03	0.0	0.0	1.99E-04	1.18E-03
NP-238	2.117 D	3.97E-01	1.20E-01	4.05E-02	1.53E-01	3.73E-01
NP-239	2.355 D	2.42E-01	1.66E-03	7.05E-05	4.14E-02	1.92E-01
NP-240	65 M	5.42E-01	5.77E-02	5.18E-03	1.30E-01	4.77E-01
NP-240M	7.4 M	1.22E 00	5.96E-01	3.15E-01	6.54E-01	1.19E 00
PU-236	2.851 Y	0.0	0.0	0.0	0.0	0.0
PU-237	45.3 D	7.30E-05	0.0	0.0	7.58E-07	1.97E-06
PU-238	87.75 Y	0.0	0.0	0.0	0.0	0.0
PU-239	24131 Y	0.0	0.0	0.0	0.0	0.0
PU-240	6537 Y	0.0	0.0	0.0	0.0	0.0
PU-241	14.4 Y	0.0	0.0	0.0	0.0	0.0
PU-242	3.758E5 Y	0.0	0.0	0.0	0.0	0.0
PU-243	4.956 H	2.36E-01	6.99E-03	5.10E-05	4.40E-02	2.07E-01
PU-244	8.26E7 Y	0.0	0.0	0.0	0.0	0.0
PU-245	10.57 H	5.45E-01	8.55E-02	1.84E-02	1.51E-01	5.01E-01
PU-246	10.85 D	2.91E-02	7.68E-07	0.0	7.28E-03	2.07E-02
AM-241	432.2 Y	7.33E-05	0.0	0.0	1.83E-06	1.52E-05
AM-242	16.02 H	2.52E-01	1.48E-02	3.85E-04	5.19E-02	2.26E-01
AM-242M	152 Y	1.75E-06	0.0	0.0	6.33E-09	0.0
AM-243	7.38E3 Y	1.90E-04	0.0	0.0	2.21E-06	2.00E-06
AM-244	10.1 H	2.91E-01	3.18E-02	7.69E-03	7.10E-02	2.31E-01
AM-245	122.4 M	4.86E-01	7.12E-02	1.04E-02	1.30E-01	4.45E-01
AM-246	25.0 M	8.53E-01	3.03E-01	1.24E-01	3.65E-01	8.17E-01
CM-242	163.2 D	0.0	0.0	0.0	0.0	0.0
CM-243	28.5 Y	1.01E-01	0.0	0.0	2.45E-02	7.70E-02
CM-244	18.11 Y	0.0	0.0	0.0	0.0	0.0
CM-245	8.5E3 Y	3.72E-02	0.0	0.0	3.90E-03	2.46E-02
CM-246	4.75E3 Y	0.0	0.0	0.0	0.0	0.0
CM-247	1.56E7 Y	1.77E-02	1.08E-04	0.0	4.47E-03	1.55E-02
CM-248	3.39E5 Y	0.0	0.0	0.0	0.0	0.0
CM-249	64.15 M	4.86E-01	8.20E-02	1.23E-02	1.38E-01	4.53E-01
CM-250	6.9E3 Y	0.0	0.0	0.0	0.0	0.0
BK-249	320 D	3.15E-03	0.0	0.0	1.73E-04	1.05E-03
BK-250	3.222 H	5.02E-01	1.14E-01	4.27E-02	1.67E-01	4.68E-01
BK-251	57.0 M	6.87E-01	1.85E-01	5.04E-02	2.46E-01	6.52E-01
CF-248	333.5 D	0.0	0.0	0.0	0.0	0.0
CF-249	350.6 Y	2.18E-02	7.49E-05	0.0	5.48E-03	1.78E-02
CF-250	13.08 Y	1.71E-05	0.0	0.0	1.82E-07	5.12E-07
CF-251	9.0E2 Y	1.67E-01	0.0	0.0	2.87E-02	1.27E-01
CF-252	2.639 Y	1.61E-05	0.0	0.0	1.87E-07	7.01E-07
CF-253	17.81 D	6.32E-02	0.0	0.0	1.63E-02	4.62E-02
CF-254	60.5 D	0.0	0.0	0.0	0.0	0.0
ES-253	20.467 D	0.0	0.0	0.0	0.0	0.0

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
ES-254	275.7 D	7.03E-05	0.0	0.0	9.46E-07	3.28E-06
ES-254M	39.3 H	2.78E-01	3.65E-02	8.09E-03	7.19E-02	2.48E-01
ES-255	39.8 D	5.46E-02	0.0	0.0	1.36E-02	3.95E-02
FM-254	3.240 H	1.29E-04	0.0	0.0	3.03E-06	2.72E-05
FM-255	20.07 H	1.89E-03	0.0	0.0	2.71E-05	1.01E-04
FM-256	157.6 M	0.0	0.0	0.0	0.0	0.0

DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
H-3	12.28 Y	0.0	0.0	0.0
BE-7	53.44 D	8.96E-02	0.0	8.96E-02
BE-10	1.6E6 Y	0.0	2.86E-01	2.86E-01
C-11	20.48 M	1.85E 00	7.02E-01	2.55E 00
C-14	5.73E3 Y	0.0	5.88E-03	5.88E-03
N-13	9.97 M	1.85E 00	9.44E-01	2.79E 00
N-16	7.13 S	9.59E 00	6.07E 00	1.57E 01
O-15	122.24 S	1.85E 00	1.50E 00	3.34E 00
F-18	109.74 M	1.79E 00	3.81E-01	2.17E 00
NA-22	2.602 Y	4.05E 00	2.85E-01	4.33E 00
NA-24	15.00 H	8.37E 00	1.08E 00	9.45E 00
MG-27	9.458 M	1.71E 00	1.42E 00	3.12E 00
MG-28	20.91 H	2.56E 00	1.80E-01	2.74E 00
AL-26	7.2E5 Y	5.20E 00	7.67E-01	5.96E 00
AL-28	2.240 M	3.54E 00	2.66E 00	6.20E 00
SI-31	157.3 M	1.66E-03	1.17E 00	1.18E 00
SI-32	3.3E2 Y	0.0	2.21E-02	2.21E-02
P-32	14.29 D	0.0	1.40E 00	1.40E 00
P-33	25.4 D	0.0	3.86E-02	3.86E-02
S-35	87.44 D	0.0	7.54E-03	7.54E-03
CL-36	3.01E5 Y	1.38E-07	3.94E-01	3.94E-01
CL-38	37.21 M	3.04E 00	3.35E 00	6.39E 00
AR-37	35.02 D	2.19E-05	0.0	2.19E-05
AR-39	269 Y	0.0	3.29E-01	3.29E-01
AR-41	1.827 H	2.40E 00	8.78E-01	3.28E 00
K-40	1.277E9 Y	2.92E-01	8.74E-01	1.17E 00
K-42	12.36 H	5.21E-01	3.10E 00	3.62E 00
K-43	22.6 H	1.77E 00	5.20E-01	2.29E 00
CA-41	1.03E5 Y	5.09E-05	0.0	5.09E-05
CA-45	162.7 D	2.12E-10	4.04E-02	4.04E-02
CA-47	4.536 D	1.99E 00	6.10E-01	2.60E 00
CA-49	8.719 M	6.61E 00	1.81E 00	8.42E 00
SC-44	3.927 H	3.96E 00	1.19E 00	5.16E 00
SC-46	83.80 D	3.83E 00	1.01E-01	3.93E 00
SC-46M	18.72 S	1.55E-01	4.09E-02	1.96E-01
SC-47	3.422 D	1.87E-01	2.05E-01	3.93E-01
SC-48	43.67 H	6.37E 00	3.29E-01	6.70E 00
SC-49	57.4 M	2.06E-03	1.69E 00	1.69E 00
TI-44	47.3 Y	2.32E-01	6.89E-06	2.32E-01
TI-45	3.08 H	1.58E 00	7.01E-01	2.28E 00
TI-51	5.752 M	6.58E-01	1.79E 00	2.45E 00
V-48	15.971 D	5.49E 00	2.45E-01	5.74E 00
V-49	330 D	1.53E-04	0.0	1.53E-04
V-52	3.75 M	2.71E 00	2.26E 00	4.96E 00
CR-49	42.09 M	1.88E 00	1.19E 00	3.07E 00
CR-51	27.704 D	5.54E-02	0.0	5.54E-02
MN-52	5.591 D	6.51E 00	1.10E-01	6.62E 00
MN-52M	21.4 M	4.45E 00	2.41E 00	6.86E 00
MN-53	3.7E6 Y	2.83E-04	0.0	2.83E-04

DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
MN-54	312.7 D	1.60E 00	0.0	1.60E 00
MN-56	2.5785 H	3.35E 00	1.71E 00	5.06E 00
MN-57	1.47 M	1.33E-01	2.33E 00	2.47E 00
FE-52	8.275 H	1.32E 00	3.42E-01	1.66E 00
FE-55	2.7 Y	3.72E-04	0.0	3.72E-04
FE-59	44.63 D	2.24E 00	1.17E-01	2.36E 00
CO-56	78.[illegible] D	7.09E 00	2.39E-01	7.33E 00
CO-57	270.9 D	2.09E-01	2.61E-03	2.12E-01
CO-58	70.80 D	1.85E 00	4.19E-02	1.89E 00
CO-58M	9.15 H	5.39E-04	0.0	5.39E-04
CO-60	5.271 Y	4.70E 00	7.21E-02	4.78E 00
CO-60M	10.47 M	8.58E-03	2.80E-03	1.14E-02
CO-61	1.650 H	1.58E-01	8.74E-01	1.03E 00
NI-56	6.10 D	3.21E 00	2.15E-03	3.21E 00
NI-57	36.08 H	3.62E 00	2.47E-01	3.87E 00
NI-59	7.5E4 Y	6.26E-04	0.0	6.26E-04
NI-63	100.1 Y	0.0	0.0	0.0
NI-65	2.520 H	1.03E 00	1.26E 00	2.30E 00
CU-61	3.408 H	1.50E 00	5.93E-01	2.09E 00
CU-62	9.74 M	1.82E 00	2.76E 00	4.58E 00
CU-64	12.701 H	3.43E-01	1.81E-01	5.24E-01
CU-67	61.88 D	1.98E-01	1.64E-01	3.62E-01
ZN-62	9.26 H	8.20E-01	3.14E-02	8.52E-01
ZN-65	244.4 D	1.10E 00	2.09E-03	1.10E 00
ZN-69	55.6 M	1.07E-05	5.56E-01	5.56E-01
ZN-69M	13.76 H	7.45E-01	4.07E-02	7.85E-01
GA-66	9.40 H	4.94E 00	2.10E 00	7.04E 00
GA-67	3.261 D	2.53E-01	2.11E-03	2.55E-01
GA-68	68.0 M	1.72E 00	1.52E 00	3.25E 00
GA-72	14.1 H	5.40E 00	9.67E-01	6.37E 00
GE-68	288 D	1.46E-03	0.0	1.46E-03
GE-71	11.8 D	1.48E-03	0.0	1.48E-03
GE-77	11.30 H	1.95E 00	1.30E 00	3.26E 00
AS-72	26.0 H	3.34E 00	2.20E 00	5.54E 00
AS-73	80.30 D	1.24E-02	0.0	1.24E-02
AS-74	17.77 D	1.41E 00	5.00E-01	1.91E 00
AS-76	26.32 H	8.01E-01	2.27E 00	3.07E 00
AS-77	38.8 H	1.52E-02	3.50E-01	3.65E-01
SE-73	7.15 H	1.96E 00	7.38E-01	2.70E 00
SE-75	119.78 D	6.76E-01	4.01E-03	6.80E-01
SE-79	6.5E4 Y	0.0	7.97E-03	7.97E-03
BR-77	57.04 H	5.71E-01	3.23E-03	5.74E-01
BR-80	17.4 M	1.38E-01	1.49E 00	1.62E 00
BR-80M	4.42 H	2.24E-02	0.0	2.24E-02
BR-82	35.30 H	4.97E 00	1.52E-01	5.13E 00
BR-83	2.39 H	1.36E-02	5.55E-01	5.68E-01
BR-84	31.80 M	3.60E 00	2.70E 00	6.30E 00
BR-85	172 S	1.27E-01	2.12E 00	2.24E 00
KR-79	35.04 H	4.58E-01	3.04E-02	4.88E-01

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VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
KR-81	2.1E5 Y	2.01E-02	0.0	2.01E-02
KR-83M	1.83 H	1.16E-03	0.0	1.16E-03
KR-85	10.72 Y	4.04E-03	4.12E-01	4.16E-01
KR-85M	4.48 H	2.73E-01	4.23E-01	6.96E-01
KR-87	76.3 M	1.58E 00	2.86E 00	4.44E 00
KR-88	2.84 H	4.00E 00	6.61E-01	4.66E 00
KR-89	3.16 M	3.60E 00	2.95E 00	6.56E 00
KR-90	32.32 S	2.42E 00	2.82E 00	5.23E 00
RB-81	4.58 H	1.09E 00	3.46E-01	1.44E 00
RB-82	1.25 M	1.99E 00	3.04E 00	5.04E 00
RB-83	86.2 D	9.10E-01	0.0	9.10E-01
RB-84	32.9 D	1.69E 00	3.17E-01	2.01E 00
RB-86	18.66 D	1.80E-01	1.36E 00	1.54E 00
RB-87	4.73E10 Y	0.0	4.47E-02	4.47E-02
RB-88	17.8 M	1.28E 00	4.64E 00	5.92E 00
RB-89	15.44 M	4.08E 00	2.16E 00	6.24E 00
RB-90	157 S	4.40E 00	4.38E 00	8.77E 00
RB-90M	258 S	6.55E 00	3.02E 00	9.57E 00
SR-82	25.0 D	3.94E-03	0.0	3.94E-03
SR-85	64.84 D	9.29E-01	5.98E-03	9.35E-01
SR-85M	67.66 M	3.73E-01	7.87E-03	3.81E-01
SR-87M	2.805 H	5.68E-01	1.17E-01	6.85E-01
SR-89	50.55 D	2.62E-04	1.17E 00	1.17E 00
SR-90	28.6 Y	0.0	2.89E-01	2.89E-01
SR-91	9.5 H	1.31E 00	1.32E 00	2.63E 00
SR-92	2.71 H	2.50E 00	2.90E-01	2.79E 00
SR-93	7.3 M	4.29E 00	1.88E 00	6.17E 00
Y-86	14.74 H	6.89E 00	4.51E-01	7.34E 00
Y-87	80.3 H	8.28E-01	2.53E-03	8.30E-01
Y-88	106.60 D	5.33E 00	1.40E-03	5.33E 00
Y-90	64.1 H	0.0	1.98E 00	1.98E 00
Y-90M	3.19 H	1.13E 00	8.36E-02	1.21E 00
Y-91	58.51 D	6.80E-03	1.22E 00	1.22E 00
Y-91M	49.71 M	9.71E-01	5.20E-02	1.02E 00
Y-92	3.54 H	4.78E-01	3.17E 00	3.65E 00
Y-93	10.1 H	1.72E-01	2.53E 00	2.71E 00
ZR-86	16.5 H	4.89E-01	1.37E-02	5.03E-01
ZR-88	83.4 D	6.84E-01	1.83E-02	7.03E-01
ZR-89	78.43 H	2.20E 00	1.81E-01	2.38E 00
ZR-93	1.53E6 Y	0.0	0.0	0.0
ZR-95	64.02 D	1.39E 00	1.12E-01	1.50E 00
ZR-97	16.90 H	3.40E-01	1.41E 00	1.75E 00
NB-90	14.60 H	8.32E 00	7.32E-01	9.06E 00
NB-91	1E4 Y	8.97E-03	1.18E-04	9.08E-03
NB-91M	61 D	8.56E-02	1.16E-02	9.72E-02
NB-92	3.6E7 Y	2.83E 00	2.76E-03	2.83E 00
NB-92M	10.15 D	1.85E 00	0.0	1.85E 00
NB-93M	14.6 Y	1.16E-03	0.0	1.16E-03
NB-94	2.03E4 Y	2.99E 00	1.74E-01	3.17E 00

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VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
NB-94M	6.26 M	1.24E-02	3.93E-03	1.63E-02
NB-95	35.06 D	1.45E 00	6.88E-03	1.46E 00
NB-95M	86.6 H	1.07E-01	2.63E-01	3.70E-01
NB-96	23.35 H	4.66E 00	4.00E-01	5.06E 00
NB-97	72.1 M	1.24E 00	8.87E-01	2.13E 00
NB-97M	60 S	1.38E 00	2.90E-02	1.41E 00
MO-91	15.49 M	1.77E 00	3.15E 00	4.93E 00
MO-93	3.5E3 Y	6.48E-03	0.0	6.48E-03
MO-99	66.02 H	2.89E-01	7.21E-01	1.01E 00
MO-101	14.61 M	2.86E 00	1.01E 00	3.87E 00
TC-95	20.0 H	1.50E 00	1.82E-03	1.50E 00
TC-95M	61 D	1.24E 00	1.01E-02	1.25E 00
TC-96	4.28 D	4.76E 00	1.91E-03	4.77E 00
TC-96M	51.5 M	8.24E-02	0.0	8.24E-02
TC-97	2.6E6 Y	7.46E-03	0.0	7.46E-03
TC-97M	89 D	6.70E-03	5.43E-03	1.21E-02
TC-98	4.2E6 Y	2.63E 00	1.21E-01	2.75E 00
TC-99	2.13E5 Y	8.85E-07	5.42E-02	5.42E-02
TC-99M	6.02 H	2.18E-01	7.70E-03	2.25E-01
TC-101	14.2 M	6.05E-01	8.98E-01	1.50E 00
RU-97	2.9 D	4.03E-01	9.01E-03	4.12E-01
RU-103	39.35 D	8.75E-01	3.81E-02	9.13E-01
RU-105	4.44 H	1.46E 00	7.40E-01	2.20E 00
RU-106	368.2 D	0.0	0.0	0.0
RH-103M	56.119 M	1.20E-03	0.0	1.20E-03
RH-105	35.36 H	1.36E-01	1.92E-01	3.28E-01
RH-105M	45 S	5.20E-02	4.75E-02	9.94E-02
RH-106	29.92 S	3.82E-01	3.06E 00	3.44E 00
PD-103	16.961 D	1.07E-02	0.0	1.07E-02
PD-107	6.5E6 Y	0.0	0.0	0.0
PD-109	13.453 H	1.25E-03	6.47E-01	6.48E-01
AG-106M	8.46 D	5.24E 00	5.49E-03	5.25E 00
AG-108	2.37 M	3.24E-02	1.21E 00	1.25E 00
AG-108M	127 Y	2.98E 00	1.09E-02	2.99E 00
AG-109M	39.6 S	1.19E-02	2.33E-03	1.42E-02
AG-110	24.57 S	5.71E-02	2.53E 00	2.58E 00
AG-110M	249.85 D	5.17E 00	6.87E-02	5.24E 00
AG-111	7.46 D	4.64E-02	6.23E-01	6.70E-01
CD-109	464 D	1.18E-02	0.0	1.18E-02
CD-111M	48.7 M	4.89E-01	8.54E-02	5.74E-01
CD-113	9.3E15 Y	0.0	6.92E-02	6.92E-02
CD-113M	13.7 Y	0.0	2.56E-01	2.56E-01
CD-115	53.46 H	3.69E-01	5.39E-01	9.09E-01
CD-115M	44.6 D	4.16E-02	1.20E 00	1.24E 00
CD-117	2.49 H	2.05E 00	8.07E-01	2.85E 00
CD-117M	3.36 H	4.03E 00	3.00E-01	4.33E 00
IN-111	2.83 D	6.83E-01	3.19E-02	7.15E-01
IN-113M	1.658 H	4.57E-01	2.32E-01	6.88E-01
IN-114	71.9 S	5.86E-02	1.58E 00	1.64E 00

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NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
IN-114M	49.51 D	1.68E-01	1.59E-01	3.26E-01
IN-115	4.6E15 Y	0.0	1.85E-01	1.85E-01
IN-115M	4.36 H	2.84E-01	2.82E-01	5.66E-01
IN-116M	54.15 M	4.69E 00	5.15E-01	5.21E 00
IN-117	43.8 M	1.25E 00	4.05E-01	1.65E 00
IN-117M	116.5 M	1.56E-01	8.31E-01	9.87E-01
SN-113	115.1 D	2.42E-02	0.0	2.42E-02
SN-117M	13.60 D	2.58E-01	1.13E-01	3.72E-01
SN-119M	293.0 D	9.79E-03	0.0	9.79E-03
SN-123	129.2 D	1.31E-02	1.04E 00	1.06E 00
SN-125	9.64 D	5.86E-01	1.71E 00	2.29E 00
SN-126	1.0E5 Y	8.77E-02	3.28E-02	1.20E-01
SB-117	2.80 H	3.06E-01	1.99E-02	3.25E-01
SB-122	2.70 D	8.16E-01	1.12E 00	1.93E 00
SB-124	60.20 D	3.58E 00	7.00E-01	4.28E 00
SB-125	2.77 Y	7.76E-01	8.56E-02	8.62E-01
SB-126	12.4 D	5.14E 00	5.23E-01	5.67E 00
SB-126M	19.0 M	2.92E 00	1.19E 00	4.11E 00
SB-127	3.85 D	1.23E 00	5.41E-01	1.77E 00
SB-129	4.40 H	2.73E 00	6.46E-01	3.37E 00
TE-121	16.8 D	1.04E 00	5.03E-03	1.04E 00
TE-121M	154 D	3.69E-01	1.65E-02	3.85E-01
TE-123	1E13 Y	1.22E-02	0.0	1.22E-02
TE-123M	119.7 D	2.45E-01	1.69E-02	2.62E-01
TE-125M	58 D	3.47E-02	1.67E-02	5.13E-02
TE-127	9.35 H	8.60E-03	3.39E-01	3.48E-01
TE-127M	109 D	1.11E-02	1.00E-02	2.11E-02
TE-129	69.6 M	1.00E-01	1.02E 00	1.12E 00
TE-129M	33.6 D	6.69E-02	4.39E-01	5.06E-01
TE-131	25.0 M	7.65E-01	1.42E 00	2.19E 00
TE-131M	30 H	2.70E 00	2.47E-01	2.94E 00
TE-132	78.2 H	3.84E-01	4.21E-02	4.26E-01
TE-133	12.45 M	1.72E 00	1.70E 00	3.42E 00
TE-133M	55.4 M	4.23E 00	1.42E 00	5.65E 00
TE-134	41.8 M	1.60E 00	1.28E-01	1.73E 00
I-122	3.62 M	1.77E 00	2.23E 00	4.00E 00
I-123	13.13 H	2.82E-01	1.45E-02	2.96E-01
I-124	4.18 D	1.99E 00	4.08E-01	2.40E 00
I-125	60.14 D	4.08E-02	0.0	4.08E-02
I-126	12.93 D	8.49E-01	2.31E-01	1.08E 00
I-128	24.99 M	1.36E-01	1.56E 00	1.70E 00
I-129	1.57E7 Y	2.64E-02	3.53E-03	3.00E-02
I-130	12.36 H	3.98E 00	4.80E-01	4.46E 00
I-131	8.040 D	6.78E-01	2.61E-01	9.39E-01
I-132	2.30 H	4.33E 00	9.39E-01	5.27E 00
I-133	20.8 H	1.11E 00	7.58E-01	1.87E 00
I-134	52.6 M	5.01E 00	1.21E 00	6.22E 00
I-135	6.61 H	3.01E 00	6.69E-01	3.68E 00
I-136	83 S	4.99E 00	4.51E 00	9.50E 00

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NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
XE-122	20.1 H	1.17E-01	1.66E-03	1.19E-01
XE-123	2.14 H	1.15E 00	3.19E-01	1.46E 00
XE-125	16.8 H	4.50E-01	2.14E-02	4.71E-01
XE-127	36.406 D	4.65E-01	2.34E-02	4.89E-01
XE-129M	8.89 D	6.08E-02	1.84E-01	2.45E-01
XE-131M	11.84 D	2.31E-02	1.13E-01	1.36E-01
XE-133	5.245 D	6.72E-02	8.23E-02	1.50E-01
XE-133M	2.19 D	5.97E-02	2.52E-01	3.12E-01
XE-135	9.11 H	4.32E-01	5.38E-01	9.69E-01
XE-135M	15.36 M	7.80E-01	1.82E-01	9.62E-01
XE-137	3.83 M	3.43E-01	3.91E 00	4.25E 00
XE-138	14.13 M	2.23E 00	1.25E 00	3.47E 00
CS-126	1.64 M	2.05E 00	2.91E 00	4.96E 00
CS-129	32.06 H	4.80E-01	5.74E-03	4.86E-01
CS-131	9.688 D	2.39E-02	0.0	2.39E-02
CS-132	6.475 D	1.32E 00	1.26E-02	1.33E 00
CS-134	2.062 Y	2.92E 00	2.31E-01	3.15E 00
CS-134M	2.90 H	3.95E-02	4.13E-02	8.08E-02
CS-135	2.3E6 Y	0.0	1.56E-02	1.56E-02
CS-136	13.16 D	4.09E 00	1.12E-01	4.20E 00
CS-137	30.17 Y	0.0	2.26E-01	2.26E-01
CS-138	32.2 M	4.56E 00	2.62E 00	7.18E 00
CS-139	9.40 M	5.97E-01	3.64E 00	4.24E 00
BA-131	11.8 D	8.26E-01	1.79E-02	8.44E-01
BA-133	10.5 Y	6.62E-01	1.34E-02	6.76E-01
BA-133M	38.9 H	1.06E-01	3.11E-01	4.17E-01
BA-135M	28.7 H	9.48E-02	3.03E-01	3.97E-01
BA-137M	2.552 M	1.12E 00	1.26E-01	1.24E 00
BA-139	83.1 M	6.10E-02	1.87E 00	1.93E 00
BA-140	12.789 D	3.40E-01	4.63E-01	8.03E-01
BA-141	18.27 M	1.64E 00	1.76E 00	3.40E 00
BA-142	10.70 M	1.69E 00	8.57E-01	2.55E 00
LA-140	40.22 H	4.42E 00	1.03E 00	5.45E 00
LA-141	3.94 H	8.04E-02	1.99E 00	2.07E 00
LA-142	95.4 M	5.53E 00	1.77E 00	7.30E 00
CE-139	137.66 D	2.62E-01	1.84E-02	2.80E-01
CE-141	32.50 D	1.30E-01	1.80E-01	3.10E-01
CE-143	33.0 H	4.77E-01	7.68E-01	1.25E 00
CE-144	284.3 D	3.15E-02	5.53E-02	8.68E-02
PR-142	19.13 H	1.11E-01	1.72E 00	1.83E 00
PR-143	13.56 D	1.69E-08	5.46E-01	5.46E-01
PR-144	17.28 M	6.39E-02	2.59E 00	2.66E 00
PR-144M	7.2 M	1.40E-02	0.0	1.40E-02
ND-147	10.98 D	2.43E-01	3.68E-01	6.11E-01
ND-149	1.73 H	6.73E-01	8.69E-01	1.54E 00
PM-143	265 D	5.75E-01	1.99E-03	5.77E-01
PM-144	363 D	2.87E 00	1.57E-02	2.89E 00
PM-145	17.7 Y	4.07E-02	7.26E-08	4.07E-02
PM-146	2020 D	1.38E 00	1.53E-01	1.54E 00

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NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
PM-147	2.6234 Y	5.97E-06	2.20E-02	2.20E-02
PM-148	5.37 D	1.08E 00	1.48E 00	2.56E 00
PM-148M	41.3 D	3.70E 00	2.01E-01	3.90E 00
PM-149	53.08 H	2.06E-02	6.56E-01	6.77E-01
PM-151	28.40 H	5.97E-01	4.77E-01	1.07E 00
SM-147	1.069E11 Y	0.0	0.0	0.0
SM-151	90 Y	6.22E-06	0.0	6.22E-06
SM-153	46.7 H	9.55E-02	3.42E-01	4.37E-01
EU-152	13.6 Y	2.14E 00	1.60E-01	2.30E 00
EU-152M	9.32 H	5.94E-01	9.83E-01	1.58E 00
EU-154	8.8 Y	2.36E 00	3.71E-01	2.73E 00
EU-155	4.96 Y	9.94E-02	8.63E-03	1.08E-01
EU-156	15.19 D	2.64E 00	7.31E-01	3.37E 00
GD-152	1.1E14 Y	0.0	0.0	0.0
GD-153	241.6 D	1.68E-01	1.30E-03	1.70E-01
GD-159	18.56 H	6.85E-02	5.37E-01	6.06E-01
GD-162	9.7 M	7.55E-01	5.65E-01	1.32E 00
TB-157	150 Y	5.92E-03	0.0	5.92E-03
TB-160	72.3 D	2.04E 00	3.53E-01	2.39E 00
TB-162	7.76 M	2.05E 00	9.37E-01	2.99E 00
DY-157	8.06 H	6.04E-01	5.58E-03	6.09E-01
DY-165	2.334 H	4.50E-02	8.29E-01	8.74E-01
DY-166	81.6 H	6.11E-02	1.18E-01	1.79E-01
HO-166	26.80 H	5.13E-02	1.37E 00	1.43E 00
HO-166M	1.20E3 Y	2.96E 00	9.23E-02	3.06E 00
ER-169	9.40 D	6.86E-06	8.06E-02	8.06E-02
ER-171	7.52 H	6.47E-01	6.57E-01	1.30E 00
TM-170	128.6 D	8.43E-03	5.46E-01	5.54E-01
TM-171	1.92 Y	1.03E-03	4.38E-05	1.07E-03
YB-169	31.97 D	5.10E-01	4.14E-02	5.52E-01
YB-175	4.19 D	6.91E-02	1.42E-01	2.11E-01
LU-177	6.71 D	5.96E-02	1.55E-01	2.15E-01
LU-177M	160.10 D	1.72E 00	1.13E-01	1.83E 00
HF-181	42.39 D	9.68E-01	1.63E-01	1.13E 00
TA-182	114.74 D	2.42E 00	1.46E-01	2.56E 00
W-181	120.95 D	6.19E-02	0.0	6.19E-02
W-185	75.1 D	4.56E-05	1.34E-01	1.34E-01
W-187	23.83 H	8.75E-01	4.47E-01	1.32E 00
W-188	69.4 D	3.05E-03	8.08E-02	8.39E-02
RE-182	64.0 H	3.20E 00	6.11E-02	3.26E 00
RE-182M	12.7 H	2.24E 00	3.60E-02	2.27E 00
RE-183	70 D	2.53E-01	1.60E-02	2.69E-01
RE-184	38.0 D	1.68E 00	1.60E-02	1.70E 00
RE-184M	169 D	7.01E-01	1.77E-02	7.19E-01
RE-186	90.64 H	3.46E-02	5.87E-01	6.21E-01
RE-187	4.7E10 Y	0.0	0.0	0.0
RE-188	16.98 H	1.04E-01	1.58E 00	1.69E 00
OS-185	93.6 D	1.31E 00	1.09E-02	1.32E 00
OS-186	2.0E15 Y	0.0	0.0	0.0

DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
OS-190M	9.9 M	2.87E 00	9.79E-02	2.97E 00
OS-191	15.4 D	1.20E-01	1.20E-02	1.32E-01
OS-191M	13.03 H	8.04E-03	9.59E-06	8.05E-03
OS-193	30.0 H	1.18E-01	6.20E-01	7.38E-01
IR-190	11.78 D	2.53E 00	6.36E-02	2.60E 00
IR-190M	1.2 H	7.34E-04	0.0	7.34E-04
IR-190M	3.2 H	7.66E-02	4.37E-03	8.10E-02
IR-192	74.02 D	1.45E 00	3.03E-01	1.76E 00
IR-193M	11.9 D	1.25E-03	2.56E-04	1.51E-03
IR-194	19.15 H	1.65E-01	1.68E 00	1.84E 00
IR-194M	171 D	4.25E 00	1.36E-01	4.38E 00
PT-191	2.71 D	5.02E-01	2.45E-02	5.27E-01
PT-193	50 Y	7.15E-04	0.0	7.15E-04
PT-193M	4.33 D	1.80E-02	6.51E-02	8.31E-02
PT-195M	4.02 D	1.17E-01	5.80E-02	1.75E-01
PT-197	18.3 H	3.94E-02	2.84E-01	3.24E-01
PT-197M	94.4 M	1.38E-01	4.38E-01	5.75E-01
AU-194	39.5 H	2.03E 00	4.66E-02	2.08E 00
AU-195	183 D	1.35E-01	1.73E-03	1.37E-01
AU-195M	30.6 S	3.44E-01	7.50E-02	4.19E-01
AU-196	6.183 D	8.28E-01	3.84E-02	8.67E-01
AU-198	2.696 D	7.22E-01	5.65E-01	1.29E 00
AU-199	3.139 D	1.52E-01	9.74E-02	2.49E-01
HG-197	64.14 H	1.11E-01	2.65E-04	1.11E-01
HG-197M	23.8 H	1.55E-01	1.48E-01	3.02E-01
HG-203	46.60 D	3.97E-01	8.34E-02	4.80E-01
TL-200	26.1 H	2.43E 00	4.30E-02	2.47E 00
TL-201	73.06 H	1.51E-01	7.02E-03	1.58E-01
TL-202	12.23 D	8.27E-01	2.34E-02	8.50E-01
TL-204	3.779 Y	1.80E-03	4.26E-01	4.28E-01
TL-207	4.77 M	4.17E-03	9.51E-01	9.55E-01
TL-208	3.053 M	6.93E 00	1.15E 00	8.08E 00
TL-209	2.20 M	3.96E 00	1.37E 00	5.33E 00
TL-210	1.30 M	5.34E 00	1.39E 00	6.73E 00
PB-203	52.02 H	5.22E-01	6.86E-02	5.90E-01
PB-204M	66.9 M	3.95E 00	1.96E-01	4.15E 00
PB-205	1.51E7 Y	9.03E-04	0.0	9.03E-04
PB-209	3.253 H	0.0	2.84E-01	2.84E-01
PB-210	22.26 Y	3.78E-03	0.0	3.78E-03
PB-211	36.1 M	9.46E-02	8.62E-01	9.57E-01
PB-212	10.643 H	2.53E-01	1.58E-01	4.11E-01
PB-214	26.8 M	4.37E-01	4.25E-01	8.62E-01
BI-206	6.243 D	6.20E 00	1.61E-01	6.36E 00
BI-207	33.4 Y	2.89E 00	2.16E-01	3.10E 00
BI-208	3.68E5 Y	5.58E 00	9.02E-03	5.59E 00
BI-210	5.013 D	0.0	7.14E-01	7.14E-01
BI-211	2.13 M	8.34E-02	1.54E-02	9.88E-02
BI-212	60.55 M	3.49E-01	9.45E-01	1.29E 00
BI-213	45.65 M	2.50E-01	8.22E-01	1.07E 00

DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR
IN SV/YR PER BQ/(CUBIC CM)

VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
BI-214	19.9 M	2.92E 00	1.30E 00	4.22E 00
PO-209	102 Y	6.41E-03	2.50E-04	6.66E-03
PO-210	138.378 D	1.62E-05	0.0	1.62E-05
PO-211	0.516 S	1.47E-02	0.0	1.47E-02
PO-212	2.98E-7 S	0.0	0.0	0.0
PO-213	4.2E-6 S	5.80E-05	0.0	5.80E-05
PO-214	1.637E-4 S	1.59E-04	0.0	1.59E-04
PO-215	1.778E-3 S	2.67E-04	0.0	2.67E-04
PO-216	0.146 S	2.76E-05	0.0	2.76E-05
PO-218	3.05 M	0.0	0.0	0.0
AT-211	7.214 H	6.37E-02	0.0	6.37E-02
AT-217	0.0323 S	4.39E-04	0.0	4.39E-04
RN-218	0.035 S	1.40E-03	0.0	1.40E-03
RN-219	3.96 S	1.01E-01	8.44E-03	1.09E-01
RN-220	55.61 S	9.55E-04	0.0	9.55E-04
RN-222	3.8235 D	7.05E-04	0.0	7.05E-04
FR-221	4.8 M	5.30E-02	9.30E-03	6.23E-02
FR-223	21.8 M	8.53E-02	6.16E-01	7.01E-01
RA-222	38.0 S	1.61E-02	1.09E-03	1.72E-02
RA-223	11.434 D	2.31E-01	4.97E-02	2.80E-01
RA-224	3.62 D	1.73E-02	2.71E-03	2.00E-02
RA-225	14.8 D	1.72E-02	7.10E-02	8.81E-02
RA-226	1600 Y	1.15E-02	3.19E-03	1.47E-02
RA-228	5.75 Y	1.04E-09	0.0	1.04E-09
AC-225	10.0 D	2.37E-02	5.26E-04	2.42E-02
AC-227	21.773 Y	2.71E-04	0.0	2.71E-04
AC-228	6.13 H	1.75E 00	6.89E-01	2.44E 00
TH-226	30.9 M	1.35E-02	3.64E-03	1.72E-02
TH-227	18.718 D	1.83E-01	1.43E-02	1.97E-01
TH-228	1.9132 Y	3.79E-03	1.26E-04	3.91E-03
TH-229	7.34E3 Y	1.49E-01	1.75E-02	1.66E-01
TH-230	7.7E4 Y	1.09E-03	0.0	1.09E-03
TH-231	25.52 H	2.56E-02	4.62E-02	7.18E-02
TH-232	1.405E10 Y	7.40E-04	3.68E-05	7.77E-04
TH-233	22.3 M	6.12E-02	7.44E-01	8.05E-01
TH-234	24.10 D	1.38E-02	7.92E-03	2.17E-02
PA-230	17.4 D	1.23E 00	3.04E-02	1.26E 00
PA-231	3.276E4 Y	5.58E-02	7.78E-03	6.36E-02
PA-233	27.0 D	3.72E-01	1.63E-01	5.35E-01
PA-234	6.70 H	3.69E 00	5.34E-01	4.22E 00
PA-234M	1.17 M	2.18E-02	1.72E 00	1.74E 00
U-230	20.8 D	2.55E-03	1.43E-04	2.69E-03
U-231	4.2 D	1.22E-01	6.95E-05	1.22E-01
U-232	72 Y	1.11E-03	7.04E-05	1.18E-03
U-233	1.592E5 Y	6.04E-04	1.13E-06	6.05E-04
U-234	2.445E5 Y	8.35E-04	3.44E-05	8.70E-04
U-235	7.038E8 Y	2.58E-01	4.96E-03	2.63E-01
U-236	2.3415E7 Y	7.47E-04	1.90E-05	7.66E-04
U-237	6.75 D	2.33E-01	7.29E-02	3.06E-01

DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR
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VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
U-238	4.468E9 Y	6.56E-04	1.26E-05	6.69E-04
U-239	23.40 M	8.28E-02	7.33E-01	8.16E-01
U-240	14.1 H	4.07E-03	1.32E-01	1.36E-01
NP-235	396.1 D	5.52E-03	3.69E-08	5.52E-03
NP-236	1.15E6 Y	2.25E-01	7.08E-02	2.96E-01
NP-236M	22.5 H	8.87E-02	9.44E-02	1.83E-01
NP-237	2.14E6 Y	4.39E-02	1.18E-03	4.51E-02
NP-238	2.117 D	1.06E 00	3.73E-01	1.43E 00
NP-239	2.355 D	2.87E-01	1.92E-01	4.79E-01
NP-240	65 M	2.16E 00	4.77E-01	2.63E 00
NP-240M	7.4 M	6.13E-01	1.19E 00	1.80E 00
PU-236	2.851 Y	9.66E-04	0.0	9.66E-04
PU-237	45.3 D	8.30E-02	1.97E-06	8.30E-02
PU-238	87.75 Y	8.27E-04	0.0	8.27E-04
PU-239	24131 Y	3.93E-04	0.0	3.93E-04
PU-240	6537 Y	7.92E-04	0.0	7.92E-04
PU-241	14.4 Y	0.0	0.0	0.0
PU-242	3.758E5 Y	6.60E-04	0.0	6.60E-04
PU-243	4.956 H	4.03E-02	2.07E-01	2.47E-01
PU-244	8.26E7 Y	5.56E-04	0.0	5.56E-04
PU-245	10.57 H	7.65E-01	5.01E-01	1.27E 00
PU-246	10.85 D	1.68E-01	2.07E-02	1.89E-01
AM-241	432.2 Y	3.80E-02	1.52E-05	3.81E-02
AM-242	16.02 H	2.49E-02	2.26E-01	2.51E-01
AM-242M	152 Y	2.81E-03	0.0	2.81E-03
AM-243	7.38E3 Y	9.08E-02	2.00E-06	9.08E-02
AM-244	10.1 H	1.52E 00	2.31E-01	1.75E 00
AM-245	122.4 M	5.37E-02	4.46E-01	5.00E-01
AM-246	25.0 M	1.86E 00	8.17E-01	2.68E 00
CM-242	163.2 D	9.00E-04	0.0	9.00E-04
CM-243	28.5 Y	2.19E-01	7.70E-02	2.96E-01
CM-244	18.11 Y	7.96E-04	0.0	7.96E-04
CM-245	8.5E3 Y	1.22E-01	2.46E-02	1.46E-01
CM-246	4.75E3 Y	7.04E-04	0.0	7.04E-04
CM-247	1.56E7 Y	5.62E-01	1.55E-02	5.78E-01
CM-248	3.39E5 Y	5.67E-04	0.0	5.67E-04
CM-249	64.15 M	3.46E-02	4.53E-01	4.87E-01
CM-250	6.9E3 Y	0.0	0.0	0.0
BK-249	320 D	0.0	1.05E-03	1.05E-03
BK-250	3.222 H	1.70E 00	4.68E-01	2.17E 00
BK-251	57.0 M	0.0	6.52E-01	6.52E-01
CF-248	333.5 D	6.57E-04	0.0	6.57E-04
CF-249	350.6 Y	5.82E-01	1.78E-02	6.00E-01
CF-250	13.08 Y	6.80E-04	5.12E-07	6.81E-04
CF-251	9.0E2 Y	2.00E-01	1.27E-01	3.27E-01
CF-252	2.639 Y	6.27E-04	7.01E-07	6.27E-04
CF-253	17.81 D	1.11E-05	4.62E-02	4.62E-02
CF-254	60.5 D	2.93E-08	0.0	2.93E-08
ES-253	20.467 D	8.91E-04	0.0	8.91E-04

DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED AIR IN SV/YR PER BQ/(CUBIC CM)

VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
ES-254	275.7 D	1.31E-02	3.28E-06	1.31E-02
ES-254M	39.3 H	1.05E 00	2.48E-01	1.30E 00
ES-255	39.8 D	4.93E-05	3.95E-02	3.96E-02
FM-254	3.240 H	7.64E-04	2.72E-05	7.91E-04
FM-255	20.07 H	8.16E-03	1.01E-04	8.26E-03
FM-256	157.6 M	0.0	0.0	0.0

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED WATER

DOSE RATE AT BODY SURFACE FOR WATER CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
H-3	12.28 Y	0.0	1.42E-05	1.42E-05
BE-7	53.44 D	2.50E-04	0.0	2.50E-04
BE-10	1.6E6 Y	0.0	5.07E-04	5.07E-04
C-11	20.48 M	5.13E-03	9.65E-04	6.09E-03
C-14	5.73E3 Y	0.0	1.24E-04	1.24E-04
N-13	9.97 M	5.13E-03	1.23E-03	6.36E-03
N-16	7.13 S	2.31E-02	7.06E-03	3.02E-02
O-15	122.24 S	5.13E-03	1.84E-03	6.98E-03
F-18	109.74 M	4.97E-03	6.05E-04	5.58E-03
NA-22	2.602 Y	1.11E-02	4.86E-04	1.16E-02
NA-24	15.00 H	2.08E-02	1.39E-03	2.22E-02
MG-27	9.458 M	4.48E-03	1.76E-03	6.24E-03
MG-28	20.91 H	6.93E-03	4.08E-04	7.33E-03
AL-26	7.2E5 Y	1.35E-02	1.12E-03	1.46E-02
AL-28	2.240 M	8.99E-03	3.16E-03	1.21E-02
SI-31	157.3 M	4.49E-06	1.49E-03	1.50E-03
SI-32	3.3E2 Y	0.0	1.62E-04	1.62E-04
P-32	14.29 D	0.0	1.74E-03	1.74E-03
P-33	25.4 D	0.0	1.92E-04	1.92E-04
S-35	87.44 D	0.0	1.22E-04	1.22E-04
CL-36	3.01E5 Y	7.91E-09	6.23E-04	6.23E-04
CL-38	37.21 M	7.51E-03	3.93E-03	1.14E-02
AR-37	35.02 D	1.11E-06	5.73E-06	6.84E-06
AR-39	269 Y	0.0	5.48E-04	5.48E-04
AR-41	1.827 H	6.50E-03	1.16E-03	7.66E-03
K-40	1.277E9 Y	7.89E-04	1.14E-03	1.93E-03
K-42	12.36 H	1.40E-03	3.64E-03	5.04E-03
K-43	22.6 H	4.86E-03	7.64E-04	5.62E-03
CA-41	1.03E5 Y	2.05E-06	6.73E-06	8.78E-06
CA-45	162.7 D	2.40E-12	1.93E-04	1.93E-04
CA-47	4.536 D	5.38E-03	8.64E-04	6.24E-03
CA-49	8.719 M	1.59E-02	2.20E-03	1.81E-02
SC-44	3.927 H	1.08E-02	1.50E-03	1.23E-02
SC-46	83.80 D	1.01E-02	2.80E-04	1.04E-02
SC-46M	18.72 S	4.50E-04	1.53E-04	6.03E-04
SC-47	3.422 D	5.44E-04	4.08E-04	9.53E-04
SC-48	43.67 H	1.69E-02	5.51E-04	1.75E-02
SC-49	57.4 M	5.27E-06	2.07E-03	2.08E-03
TI-44	47.3 Y	7.17E-04	3.15E-05	7.49E-04
TI-45	3.08 H	4.38E-03	9.35E-04	5.31E-03
TI-51	5.752 M	1.85E-03	2.18E-03	4.04E-03
V-48	15.971 D	1.47E-02	3.71E-04	1.51E-02
V-49	330 D	4.50E-06	1.00E-05	1.45E-05
V-52	3.75 M	7.32E-03	2.71E-03	1.00E-02
CR-49	42.09 M	5.26E-03	1.50E-03	6.77E-03
CR-51	27.704 D	1.64E-04	1.06E-05	1.75E-04
MN-52	5.591 D	1.74E-02	1.86E-04	1.76E-02
MN-52M	21.4 M	1.22E-02	2.87E-03	1.50E-02
MN-53	3.7E6 Y	6.96E-06	1.12E-05	1.82E-05

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED WATER

DOSE RATE AT BODY SURFACE FOR WATER CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
MN-54	312.7 D	4.20E-03	1.12E-05	4.21E-03
MN-56	2.5785 H	8.51E-03	2.10E-03	1.06E-02
MN-57	1.47 M	3.75E-04	2.82E-03	3.20E-03
FE-52	8.275 H	3.70E-03	4.99E-04	4.20E-03
FE-55	2.7 Y	8.42E-06	1.18E-05	2.02E-05
FE-59	44.63 D	6.01E-03	2.94E-04	6.31E-03
CO-56	78.76 D	1.82E-02	3.11E-04	1.85E-02
CO-57	270.9 D	6.30E-04	5.35E-05	6.84E-04
CO-58	70.80 D	4.90E-03	8.57E-05	4.98E-03
CO-58M	9.15 H	1.03E-05	7.23E-05	8.26E-05
CO-60	5.271 Y	1.27E-02	2.39E-04	1.29E-02
CO-60M	10.47 M	3.35E-05	1.63E-04	1.97E-04
CO-61	1.650 H	4.63E-04	1.18E-03	1.64E-03
NI-56	6.10 D	8.64E-03	1.90E-05	8.66E-03
NI-57	36.08 H	9.70E-03	3.60E-04	1.01E-02
NI-59	7.5E4 Y	1.21E-05	1.28E-05	2.49E-05
NI-63	100.1 Y	0.0	4.29E-05	4.29E-05
NI-65	2.520 H	2.78E-03	1.59E-03	4.37E-03
CU-61	3.408 H	4.14E-03	7.76E-04	4.92E-03
CU-62	9.74 M	5.06E-03	3.27E-03	8.33E-03
CU-64	12.701 H	9.58E-04	3.08E-04	1.27E-03
CU-67	61.88 D	5.80E-04	3.96E-04	9.75E-04
ZN-62	9.26 H	2.29E-03	8.15E-05	2.37E-03
ZN-65	244.4 D	2.95E-03	1.85E-05	2.97E-03
ZN-69	55.6 M	3.01E-08	8.05E-04	8.05E-04
ZN-69M	13.76 H	2.09E-03	6.34E-05	2.15E-03
GA-66	9.40 H	1.25E-02	2.47E-03	1.50E-02
GA-67	3.261 D	7.53E-04	9.68E-05	8.50E-04
GA-68	68.0 M	4.78E-03	1.86E-03	6.64E-03
GA-72	14.1 H	1.36E-02	1.26E-03	1.49E-02
GE-68	288 D	2.13E-05	1.40E-05	3.53E-05
GE-71	11.8 D	2.15E-05	1.41E-05	3.56E-05
GE-77	11.30 H	5.35E-03	1.65E-03	7.00E-03
AS-72	26.0 H	8.97E-03	2.63E-03	1.16E-02
AS-73	80.30 D	8.19E-05	1.75E-04	2.57E-04
AS-74	17.77 D	3.85E-03	6.75E-04	4.52E-03
AS-76	26.32 H	2.16E-03	2.70E-03	4.86E-03
AS-77	38.8 H	4.32E-05	5.72E-04	6.15E-04
SE-73	7.15 H	5.52E-03	9.85E-04	6.50E-03
SE-75	119.78 D	1.97E-03	3.90E-05	2.01E-03
SE-79	6.5E4 Y	0.0	1.31E-04	1.31E-04
BR-77	57.04 H	1.61E-03	2.32E-05	1.63E-03
BR-80	17.4 M	3.76E-04	1.83E-03	2.20E-03
BR-80M	4.42 H	1.26E-04	1.78E-04	3.04E-04
BR-82	35.30 H	1.33E-02	3.41E-04	1.36E-02
BR-83	2.39 H	3.74E-05	8.03E-04	8.41E-04
BR-84	31.80 M	8.99E-03	3.19E-03	1.22E-02
BR-85	172 S	3.32E-04	2.54E-03	2.87E-03
KR-79	35.04 H	1.30E-03	6.12E-05	1.36E-03

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED WATER

DOSE RATE AT BODY SURFACE FOR WATER CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
KR-81	2.1E5 Y	8.18E-05	1.39E-05	9.57E-05
KR-83M	1.83 H	1.33E-05	1.12E-04	1.25E-04
KR-85	10.72 Y	1.12E-05	6.27E-04	6.39E-04
KR-85M	4.48 H	7.93E-04	6.50E-04	1.44E-03
KR-87	76.3 M	3.99E-03	3.37E-03	7.36E-03
KR-88	2.84 H	9.85E-03	9.23E-04	1.08E-02
KR-89	3.16 M	9.24E-03	3.48E-03	1.27E-02
KR-90	32.32 S	6.42E-03	3.36E-03	9.77E-03
RB-81	4.58 H	3.08E-03	5.48E-04	3.62E-03
RB-82	1.25 M	5.50E-03	3.58E-03	9.09E-03
RB-83	86.2 D	2.54E-03	2.06E-05	2.56E-03
RB-84	32.9 D	4.53E-03	4.16E-04	4.94E-03
RB-86	18.66 D	4.78E-04	1.67E-03	2.15E-03
RB-87	4.73E10 Y	0.0	1.97E-04	1.97E-04
RB-88	17.8 M	3.21E-03	5.35E-03	8.56E-03
RB-89	15.44 M	1.04E-02	2.59E-03	1.30E-02
RB-90	157 S	1.08E-02	5.07E-03	1.59E-02
RB-90M	258 S	1.65E-02	3.55E-03	2.00E-02
SR-82	25.0 D	4.10E-05	1.49E-05	5.59E-05
SR-85	64.84 D	2.61E-03	2.40E-05	2.63E-03
SR-85M	67.66 M	1.09E-03	3.61E-05	1.12E-03
SR-87M	2.805 H	1.61E-03	1.90E-04	1.80E-03
SR-89	50.55 D	6.86E-07	1.46E-03	1.46E-03
SR-90	28.6 Y	0.0	4.90E-04	4.90E-04
SR-91	9.5 H	3.45E-03	1.65E-03	5.10E-03
SR-92	2.71 H	6.78E-03	5.02E-04	7.28E-03
SR-93	7.3 M	1.13E-02	2.33E-03	1.36E-02
Y-86	14.74 H	1.81E-02	5.71E-04	1.87E-02
Y-87	80.3 H	2.34E-03	1.91E-05	2.36E-03
Y-88	106.60 D	1.36E-02	1.70E-05	1.36E-02
Y-90	64.1 H	0.0	2.36E-03	2.36E-03
Y-90M	3.19 H	3.19E-03	1.34E-04	3.32E-03
Y-91	58.51 D	1.83E-05	1.51E-03	1.53E-03
Y-91M	49.71 M	2.66E-03	7.72E-05	2.74E-03
Y-92	3.54 H	1.27E-03	3.68E-03	4.95E-03
Y-93	10.1 H	4.49E-04	2.98E-03	3.43E-03
ZR-86	16.5 H	1.48E-03	8.86E-05	1.57E-03
ZR-88	83.4 D	1.97E-03	4.45E-05	2.01E-03
ZR-89	78.43 H	5.84E-03	2.58E-04	6.10E-03
ZR-93	1.53E6 Y	0.0	4.90E-05	4.90E-05
ZR-95	64.02 D	3.67E-03	2.91E-04	3.97E-03
ZR-97	16.90 H	9.10E-04	1.75E-03	2.66E-03
NB-90	14.60 H	2.10E-02	1.01E-03	2.20E-02
NB-91	1E4 Y	6.20E-05	1.56E-05	7.76E-05
NB-91M	61 D	2.62E-04	2.65E-04	5.27E-04
NB-92	3.6E7 Y	7.56E-03	1.93E-05	7.58E-03
NB-92M	10.15 D	4.87E-03	1.52E-05	4.89E-03
NB-93M	14.6 Y	1.02E-05	8.26E-05	9.28E-05
NB-94	2.03E4 Y	7.88E-03	3.69E-04	8.25E-03

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED WATER

DOSE RATE AT BODY SURFACE FOR WATER CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
NB-94M	6.26 M	5.90E-05	1.01E-04	1.60E-04
NB-95	35.06 D	3.83E-03	1.11E-04	3.94E-03
NB-95M	86.6 H	3.34E-04	5.12E-04	8.46E-04
NB-96	23.35 H	1.24E-02	6.30E-04	1.31E-02
NB-97	72.1 M	3.32E-03	1.17E-03	4.49E-03
NB-97M	60 S	3.64E-03	4.11E-05	3.68E-03
MO-91	15.49 M	4.92E-03	3.70E-03	8.62E-03
MO-93	3.5E3 Y	5.60E-05	1.49E-05	7.10E-05
MO-99	66.02 H	7.76E-04	9.94E-04	1.77E-03
MO-101	14.61 M	7.55E-03	1.37E-03	8.92E-03
TC-95	20.0 H	3.99E-03	1.79E-05	4.01E-03
TC-95M	61 D	3.39E-03	4.08E-05	3.43E-03
TC-96	4.28 D	1.26E-02	1.78E-05	1.26E-02
TC-96M	51.5 M	2.42E-04	7.76E-05	3.20E-04
TC-97	2.6E6 Y	6.17E-05	1.52E-05	7.69E-05
TC-97M	89 D	5.05E-05	2.49E-04	3.00E-04
TC-98	4.2E6 Y	6.97E-03	3.03E-04	7.27E-03
TC-99	2.13E5 Y	2.63E-09	2.11E-04	2.11E-04
TC-99M	6.02 H	6.36E-04	4.52E-05	6.81E-04
TC-101	14.2 M	1.72E-03	1.19E-03	2.91E-03
RU-97	2.9 D	1.21E-03	3.48E-05	1.24E-03
RU-103	39.35 D	2.43E-03	1.76E-04	2.61E-03
RU-105	4.44 H	3.93E-03	1.01E-03	4.94E-03
RU-106	368.2 D	0.0	2.51E-05	2.51E-05
RH-103M	56.119 M	9.03E-06	1.08E-04	1.17E-04
RH-105	35.36 H	3.91E-04	3.84E-04	7.75E-04
RH-105M	45 S	1.78E-04	2.97E-04	4.75E-04
RH-106	29.92 S	1.04E-03	3.59E-03	4.63E-03
PD-103	16.961 D	7.64E-05	1.46E-05	9.11E-05
PD-107	6.5E6 Y	0.0	2.32E-05	2.32E-05
PD-109	13.453 H	3.46E-06	9.05E-04	9.09E-04
AG-106M	8.46 D	1.41E-02	2.33E-05	1.42E-02
AG-108	2.37 M	8.89E-05	1.53E-03	1.62E-03
AG-108M	127 Y	8.11E-03	4.11E-05	8.15E-03
AG-109M	39.6 S	5.87E-05	2.19E-04	2.78E-04
AG-110	24.57 S	1.53E-04	3.00E-03	3.15E-03
AG-110M	249.85 D	1.37E-02	1.73E-04	1.39E-02
AG-111	7.46 D	1.33E-04	8.79E-04	1.01E-03
CD-109	464 D	7.86E-05	1.39E-05	9.25E-05
CD-111M	48.7 M	1.44E-03	3.13E-04	1.76E-03
CD-113	9.3E15 Y	0.0	2.33E-04	2.33E-04
CD-113M	13.7 Y	0.0	4.65E-04	4.65E-04
CD-115	53.46 H	1.03E-03	7.86E-04	1.81E-03
CD-115M	44.6 D	1.10E-04	1.52E-03	1.63E-03
CD-117	2.49 H	5.52E-03	1.09E-03	6.61E-03
CD-117M	3.36 H	1.03E-02	5.10E-04	1.08E-02
IN-111	2.83 D	2.04E-03	9.70E-05	2.13E-03
IN-113M	1.658 H	1.31E-03	3.76E-04	1.68E-03
IN-114	71.9 S	1.60E-04	1.94E-03	2.10E-03

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED WATER

DOSE RATE AT BODY SURFACE FOR WATER CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
IN-114M	49.51 D	4.89E-04	4.11E-04	9.01E-04
IN-115	4.6E15 Y	0.0	3.81E-04	3.81E-04
IN-115M	4.36 H	8.35E-04	4.81E-04	1.32E-03
IN-116M	54.15 M	1.24E-02	7.55E-04	1.32E-02
IN-117	43.8 M	3.46E-03	6.75E-04	4.14E-03
IN-117M	116.5 M	4.63E-04	1.11E-03	1.58E-03
SN-113	115.1 D	1.20E-04	1.46E-05	1.35E-04
SN-117M	13.60 D	7.95E-04	4.50E-04	1.25E-03
SN-119M	293.0 D	6.00E-05	2.20E-04	2.80E-04
SN-123	129.2 D	3.48E-05	1.30E-03	1.34E-03
SN-125	9.64 D	1.53E-03	2.04E-03	3.57E-03
SN-126	1.0E5 Y	2.90E-04	3.27E-04	6.16E-04
SB-117	2.80 H	9.35E-04	7.91E-05	1.01E-03
SB-122	2.70 D	2.23E-03	1.41E-03	3.64E-03
SB-124	60.20 D	9.41E-03	9.57E-04	1.04E-02
SB-125	2.77 Y	2.17E-03	2.49E-04	2.42E-03
SB-126	12.4 D	1.38E-02	7.54E-04	1.45E-02
SB-126M	19.0 M	7.86E-03	1.49E-03	9.35E-03
SB-127	3.85 D	3.31E-03	7.92E-04	4.11E-03
SB-129	4.40 H	7.19E-03	8.99E-04	8.09E-03
TE-121	16.8 D	2.90E-03	2.33E-05	2.92E-03
TE-121M	154 D	1.09E-03	2.26E-04	1.32E-03
TE-123	1E13 Y	6.88E-05	1.17E-05	8.04E-05
TE-123M	119.7 D	7.46E-04	2.83E-04	1.03E-03
TE-125M	58 D	1.84E-04	3.60E-04	5.44E-04
TE-127	9.35 H	2.43E-05	5.58E-04	5.82E-04
TE-127M	109 D	5.88E-05	2.29E-04	2.88E-04
TE-129	69.6 M	2.91E-04	1.38E-03	1.67E-03
TE-129M	33.6 D	1.99E-04	6.97E-04	8.96E-04
TE-131	25.0 M	2.12E-03	1.82E-03	3.93E-03
TE-131M	30 H	7.17E-03	4.94E-04	7.66E-03
TE-132	78.2 H	1.16E-03	2.62E-04	1.42E-03
TE-133	12.45 M	4.68E-03	2.08E-03	6.76E-03
TE-133M	55.4 M	1.12E-02	1.80E-03	1.30E-02
TE-134	41.8 M	4.38E-03	3.81E-04	4.76E-03
I-122	3.62 M	4.90E-03	2.64E-03	7.54E-03
I-123	13.13 H	8.74E-04	7.69E-05	9.51E-04
I-124	4.18 D	5.35E-03	5.03E-04	5.85E-03
I-125	60.14 D	2.18E-04	5.04E-05	2.68E-04
I-126	12.93 D	2.33E-03	3.38E-04	2.67E-03
I-128	24.99 M	3.81E-04	1.92E-03	2.30E-03
I-129	1.57E7 Y	1.29E-04	1.41E-04	2.70E-04
I-130	12.36 H	1.07E-02	7.21E-04	1.14E-02
I-131	8.040 D	1.91E-03	4.80E-04	2.39E-03
I-132	2.30 H	1.15E-02	1.23E-03	1.27E-02
I-133	20.8 H	3.05E-03	1.03E-03	4.08E-03
I-134	52.6 M	1.32E-02	1.53E-03	1.47E-02
I-135	6.61 H	7.96E-03	9.25E-04	8.89E-03
I-136	83 S	1.28E-02	5.20E-03	1.80E-02

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED WATER

DOSE RATE AT BODY SURFACE FOR WATER CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
XE-122	20.1 H	3.90E-04	2.41E-05	4.14E-04
XE-123	2.14 H	3.18E-03	4.74E-04	3.65E-03
XE-125	16.8 H	1.36E-03	9.32E-05	1.45E-03
XE-127	36.406 D	1.40E-03	8.74E-05	1.49E-03
XE-129M	8.89 D	2.68E-04	5.25E-04	7.93E-04
XE-131M	11.84 D	1.04E-04	4.12E-04	5.16E-04
XE-133	5.245 D	2.33E-04	3.53E-04	5.86E-04
XE-133M	2.19 D	2.11E-04	5.50E-04	7.61E-04
XE-135	9.11 H	1.24E-03	8.04E-04	2.05E-03
XE-135M	15.36 M	2.17E-03	2.75E-04	2.44E-03
XE-137	3.83 M	9.44E-04	4.53E-03	5.47E-03
XE-138	14.13 M	5.67E-03	1.60E-03	7.28E-03
CS-126	1.64 M	5.67E-03	3.43E-03	9.10E-03
CS-129	32.06 H	1.43E-03	4.10E-05	1.47E-03
CS-131	9.688 D	1.20E-04	1.46E-05	1.34E-04
CS-132	6.475 D	3.58E-03	3.42E-05	3.62E-03
CS-134	2.062 Y	7.79E-03	4.08E-04	8.20E-03
CS-134M	2.90 H	1.39E-04	3.13E-04	4.52E-04
CS-135	2.3E6 Y	0.0	1.41E-04	1.41E-04
CS-136	13.16 D	1.09E-02	3.45E-04	1.13E-02
CS-137	30.17 Y	0.0	4.28E-04	4.28E-04
CS-138	32.2 M	1.19E-02	3.11E-03	1.50E-02
CS-139	9.40 M	1.55E-03	4.23E-03	5.77E-03
BA-131	11.8 D	2.39E-03	1.21E-04	2.51E-03
BA-133	10.5 Y	1.98E-03	1.46E-04	2.13E-03
BA-133M	38.9 H	3.46E-04	6.27E-04	9.72E-04
BA-135M	28.7 H	3.10E-04	5.93E-04	9.04E-04
BA-137M	2.552 M	2.99E-03	1.82E-04	3.17E-03
BA-139	83.1 M	1.77E-04	2.28E-03	2.46E-03
BA-140	12.789 D	9.60E-04	7.76E-04	1.74E-03
BA-141	18.27 M	4.48E-03	2.17E-03	6.65E-03
BA-142	10.70 M	4.57E-03	1.19E-03	5.75E-03
LA-140	40.22 H	1.17E-02	1.34E-03	1.30E-02
LA-141	3.94 H	2.16E-04	2.40E-03	2.61E-03
LA-142	95.4 M	1.37E-02	2.14E-03	1.58E-02
CE-139	137.66 D	8.13E-04	9.14E-05	9.04E-04
CE-141	32.50 D	3.87E-04	4.35E-04	8.23E-04
CE-143	33.0 H	1.38E-03	1.11E-03	2.48E-03
CE-144	284.3 D	9.77E-05	2.35E-04	3.33E-04
PR-142	19.13 H	2.96E-04	2.04E-03	2.33E-03
PR-143	13.56 D	4.45E-11	7.92E-04	7.92E-04
PR-144	17.28 M	1.60E-04	3.07E-03	3.23E-03
PR-144M	7.2 M	6.19E-05	1.31E-04	1.93E-04
ND-147	10.98 D	7.12E-04	6.85E-04	1.40E-03
ND-149	1.73 H	1.92E-03	1.24E-03	3.16E-03
PM-143	265 D	1.58E-03	1.77E-05	1.59E-03
PM-144	363 D	7.78E-03	3.81E-05	7.82E-03
PM-145	17.7 Y	1.68E-04	3.56E-05	2.03E-04
PM-146	2020 D	3.78E-03	2.48E-04	4.02E-03

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED WATER

DOSE RATE AT BODY SURFACE FOR WATER CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
PM-147	2.6234 Y	1.74E-08	1.55E-04	1.55E-04
PM-148	5.37 D	2.90E-03	1.83E-03	4.73E-03
PM-148M	41.3 D	9.98E-03	4.18E-04	1.04E-02
PM-149	53.08 H	5.84E-05	9.15E-04	9.74E-04
PM-151	28.40 H	1.69E-03	7.71E-04	2.46E-03
SM-147	1.069E11 Y	0.0	0.0	0.0
SM-151	90 Y	6.51E-08	4.97E-05	4.98E-05
SM-153	46.7 H	3.16E-04	6.84E-04	1.00E-03
EU-152	13.6 Y	5.82E-03	3.26E-04	6.14E-03
EU-152M	9.32 H	1.59E-03	1.25E-03	2.84E-03
EU-154	8.8 Y	6.32E-03	7.05E-04	7.02E-03
EU-155	4.96 Y	3.09E-04	1.61E-04	4.70E-04
EU-156	15.19 D	6.79E-03	1.05E-03	7.84E-03
GD-152	1.1E14 Y	0.0	0.0	0.0
GD-153	241.6 D	5.69E-04	1.22E-04	6.90E-04
GD-159	18.56 H	2.04E-04	7.94E-04	9.98E-04
GD-162	9.7 M	2.13E-03	8.47E-04	2.97E-03
TB-157	150 Y	2.58E-05	9.26E-06	3.51E-05
TB-160	72.3 D	5.45E-03	6.98E-04	6.15E-03
TB-162	7.76 M	5.51E-03	1.32E-03	6.83E-03
DY-157	8.06 H	1.78E-03	3.06E-05	1.81E-03
DY-165	2.334 H	1.30E-04	1.12E-03	1.25E-03
DY-166	81.6 H	2.06E-04	4.10E-04	6.17E-04
HO-166	26.80 H	1.49E-04	1.75E-03	1.90E-03
HO-166M	1.20E3 Y	8.01E-03	4.02E-04	8.41E-03
ER-169	9.40 D	7.50E-08	2.57E-04	2.57E-04
ER-171	7.52 H	1.88E-03	1.06E-03	2.94E-03
TM-170	128.6 D	2.79E-05	8.32E-04	8.60E-04
TM-171	1.92 Y	3.55E-06	6.44E-05	6.80E-05
YB-169	31.97 D	1.59E-03	3.26E-04	1.91E-03
YB-175	4.19 D	1.99E-04	3.27E-04	5.25E-04
LU-177	6.71 D	1.76E-04	3.74E-04	5.50E-04
LU-177M	160.10 D	4.99E-03	7.40E-04	5.73E-03
HF-181	42.39 D	2.74E-03	5.16E-04	3.25E-03
TA-182	114.74 D	6.57E-03	5.30E-04	7.10E-03
W-181	120.95 D	2.09E-04	2.35E-05	2.33E-04
W-185	75.1 D	1.33E-07	3.17E-04	3.18E-04
W-187	23.83 H	2.39E-03	7.34E-04	3.12E-03
W-188	69.4 D	8.87E-06	2.48E-04	2.57E-04
RE-182	64.0 H	8.87E-03	6.81E-04	9.55E-03
RE-182M	12.7 H	6.07E-03	2.30E-04	6.30E-03
RE-183	70 D	7.98E-04	2.79E-04	1.08E-03
RE-184	38.0 D	4.49E-03	1.42E-04	4.63E-03
RE-184M	169 D	1.97E-03	3.78E-04	2.34E-03
RE-186	90.64 H	1.05E-04	8.59E-04	9.64E-04
RE-187	4.7E10 Y	0.0	1.66E-06	1.66E-06
RE-188	16.98 H	2.92E-04	1.97E-03	2.26E-03
OS-185	93.6 D	3.54E-03	3.60E-05	3.58E-03
OS-186	2.0E15 Y	0.0	0.0	0.0

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED WATER

DOSE RATE AT BODY SURFACE FOR WATER CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
OS-190M	9.9 M	7.97E-03	3.19E-04	8.29E-03
OS-191	15.4 D	3.79E-04	3.50E-04	7.28E-04
OS-191M	13.03 H	3.39E-05	1.83E-04	2.17E-04
OS-193	30.0 H	3.42E-04	9.46E-04	1.29E-03
IR-190	11.78 D	7.03E-03	1.74E-04	7.21E-03
IR-190M	1.2 H	1.09E-05	5.65E-05	6.74E-05
IR-190M	3.2 H	2.52E-04	3.35E-05	2.86E-04
IR-192	74.02 D	4.11E-03	5.54E-04	4.67E-03
IR-193M	11.9 D	1.23E-05	2.12E-04	2.25E-04
IR-194	19.15 H	4.58E-04	2.04E-03	2.50E-03
IR-194M	171 D	1.17E-02	4.15E-04	1.21E-02
PT-191	2.71 D	1.48E-03	1.80E-04	1.66E-03
PT-193	50 Y	1.06E-05	9.52E-06	2.02E-05
PT-193M	4.33 D	6.60E-05	3.72E-04	4.38E-04
PT-195M	4.02 D	3.88E-04	4.93E-04	8.81E-04
PT-197	18.3 H	1.26E-04	6.52E-04	7.78E-04
PT-197M	94.4 M	4.27E-04	9.03E-04	1.33E-03
AU-194	39.5 H	5.45E-03	9.00E-05	5.54E-03
AU-195	183 D	4.41E-04	1.23E-04	5.64E-04
AU-195M	30.6 S	1.01E-03	3.19E-04	1.33E-03
AU-196	6.183 D	2.39E-03	9.03E-05	2.48E-03
AU-198	2.696 D	2.03E-03	8.25E-04	2.86E-03
AU-199	3.139 D	4.49E-04	3.76E-04	8.26E-04
HG-197	64.14 H	3.62E-04	1.74E-04	5.36E-04
HG-197M	23.8 H	4.77E-04	6.01E-04	1.08E-03
HG-203	46.60 D	1.15E-03	2.87E-04	1.44E-03
TL-200	26.1 H	6.65E-03	8.74E-05	6.74E-03
TL-201	73.06 H	4.77E-04	1.04E-04	5.81E-04
TL-202	12.23 D	2.36E-03	5.30E-05	2.41E-03
TL-204	3.779 Y	5.83E-06	5.95E-04	6.01E-04
TL-207	4.77 M	1.09E-05	1.24E-03	1.25E-03
TL-208	3.053 M	1.69E-02	1.49E-03	1.84E-02
TL-209	2.20 M	1.07E-02	1.73E-03	1.24E-02
TL-210	1.30 M	1.39E-02	1.82E-03	1.57E-02
PB-203	52.02 H	1.54E-03	1.61E-04	1.70E-03
PB-204M	66.9 M	1.05E-02	2.83E-04	1.08E-02
PB-205	1.51E7 Y	1.20E-05	7.79E-06	1.98E-05
PB-209	3.253 H	0.0	4.95E-04	4.95E-04
PB-210	22.26 Y	2.34E-05	9.76E-05	1.21E-04
PB-211	36.1 M	2.55E-04	1.14E-03	1.40E-03
PB-212	10.643 H	7.45E-04	4.62E-04	1.21E-03
PB-214	26.8 M	1.25E-03	7.51E-04	2.01E-03
BI-206	6.243 D	1.65E-02	3.45E-04	1.68E-02
BI-207	33.4 Y	7.76E-03	3.13E-04	8.07E-03
BI-208	3.68E5 Y	1.33E-02	2.42E-05	1.33E-02
BI-210	5.013 D	0.0	9.76E-04	9.76E-04
BI-211	2.13 M	2.39E-04	2.80E-05	2.67E-04
BI-212	60.55 M	9.25E-04	1.18E-03	2.11E-03
BI-213	45.65 M	6.99E-04	1.11E-03	1.81E-03

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED WATER

DOSE RATE AT BODY SURFACE FOR WATER CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
BI-214	19.9 M	7.61E-03	1.63E-03	9.24E-03
PO-209	102 Y	1.74E-05	2.81E-06	2.02E-05
PO-210	138.378 D	4.26E-08	0.0	4.26E-08
PO-211	0.516 S	3.90E-05	0.0	3.90E-05
PO-212	2.98E-7 S	0.0	0.0	0.0
PO-213	4.2E-6 S	1.53E-07	0.0	1.53E-07
PO-214	1.637E-4 S	4.18E-07	0.0	4.18E-07
PO-215	1.778E-3 S	7.48E-07	0.0	7.48E-07
PO-216	0.146 S	7.27E-08	0.0	7.27E-08
PO-218	3.05 M	0.0	0.0	0.0
AT-211	7.214 H	1.99E-04	8.74E-06	2.08E-04
AT-217	0.0323 S	1.19E-06	0.0	1.19E-06
RN-218	0.035 S	3.78E-06	0.0	3.78E-06
RN-219	3.96 S	2.88E-04	1.79E-05	3.06E-04
RN-220	55.61 S	2.62E-06	0.0	2.62E-06
RN-222	3.8235 D	1.96E-06	0.0	1.96E-06
FR-221	4.8 M	1.55E-04	2.70E-05	1.82E-04
FR-223	21.8 M	2.77E-04	9.70E-04	1.25E-03
RA-222	38.0 S	4.62E-05	2.05E-06	4.83E-05
RA-223	11.434 D	6.83E-04	2.06E-04	8.89E-04
RA-224	3.62 D	5.02E-05	6.30E-06	5.65E-05
RA-225	14.8 D	7.54E-05	2.67E-04	3.42E-04
RA-226	1600 Y	3.39E-05	9.98E-06	4.39E-05
RA-228	5.75 Y	2.11E-11	2.96E-05	2.96E-05
AC-225	10.0 D	7.95E-05	6.33E-05	1.43E-04
AC-227	21.773 Y	1.38E-06	3.19E-05	3.33E-05
AC-228	6.13 H	4.67E-03	1.10E-03	5.77E-03
TH-226	30.9 M	4.30E-05	5.67E-05	9.97E-05
TH-227	18.718 D	5.52E-04	1.12E-04	6.65E-04
TH-228	1.9132 Y	1.57E-05	5.51E-05	7.08E-05
TH-229	7.34E3 Y	4.81E-04	2.90E-04	7.70E-04
TH-230	7.7E4 Y	7.26E-06	3.74E-05	4.47E-05
TH-231	25.52 H	1.21E-04	4.18E-04	5.40E-04
TH-232	1.405E10 Y	6.19E-06	3.17E-05	3.79E-05
TH-233	22.3 M	1.77E-04	1.04E-03	1.22E-03
TH-234	24.10 D	4.64E-05	1.51E-04	1.97E-04
PA-230	17.4 D	3.33E-03	1.51E-04	3.48E-03
PA-231	3.276E4 Y	1.88E-04	1.04E-04	2.92E-04
PA-233	27.0 D	1.10E-03	5.32E-04	1.63E-03
PA-234	6.70 H	9.89E-03	1.35E-03	1.12E-02
PA-234M	1.17 M	5.75E-05	2.08E-03	2.13E-03
U-230	20.8 D	1.36E-05	5.62E-05	6.97E-05
U-231	4.2 D	4.18E-04	1.67E-04	5.85E-04
U-232	72 Y	9.24E-06	4.19E-05	5.11E-05
U-233	1.592E5 Y	3.70E-06	8.77E-06	1.25E-05
U-234	2.445E5 Y	7.66E-06	3.29E-05	4.06E-05
U-235	7.038E8 Y	7.66E-04	1.22E-04	8.88E-04
U-236	2.3415E7 Y	7.13E-06	2.79E-05	3.50E-05
U-237	6.75 D	7.30E-04	5.03E-04	1.23E-03

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED WATER

DOSE RATE AT BODY SURFACE FOR WATER CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
U-238	4.468E9 Y	6.29E-06	2.48E-05	3.11E-05
U-239	23.40 M	2.54E-04	1.03E-03	1.28E-03
U-240	14.1 H	3.50E-05	3.96E-04	4.31E-04
NP-235	396.1 D	3.54E-05	8.69E-06	4.41E-05
NP-236	1.15E6 Y	7.31E-04	5.67E-04	1.30E-03
NP-236M	22.5 H	2.71E-04	2.10E-04	4.81E-04
NP-237	2.14E6 Y	1.69E-04	1.82E-04	3.50E-04
NP-238	2.117 D	2.80E-03	6.50E-04	3.45E-03
NP-239	2.355 D	8.68E-04	6.59E-04	1.53E-03
NP-240	65 M	5.85E-03	1.15E-03	7.00E-03
NP-240M	7.4 M	1.68E-03	1.55E-03	3.23E-03
PU-236	2.851 Y	9.48E-06	3.10E-05	4.05E-05
PU-237	45.3 D	2.73E-04	2.52E-05	2.98E-04
PU-238	87.75 Y	8.32E-06	2.41E-05	3.24E-05
PU-239	24131 Y	3.39E-06	1.43E-05	1.77E-05
PU-240	6537 Y	7.94E-06	2.43E-05	3.22E-05
PU-241	14.4 Y	0.0	1.31E-05	1.31E-05
PU-242	3.758E5 Y	6.59E-06	2.00E-05	2.65E-05
PU-243	4.956 H	1.27E-04	4.31E-04	5.58E-04
PU-244	8.26E7 Y	5.68E-06	1.68E-05	2.25E-05
PU-245	10.57 H	2.10E-03	8.33E-04	2.93E-03
PU-246	10.85 D	5.06E-04	1.35E-04	6.41E-04
AM-241	432.2 Y	1.46E-04	8.57E-05	2.32E-04
AM-242	16.02 H	9.06E-05	4.41E-04	5.32E-04
AM-242M	152 Y	2.45E-05	1.05E-04	1.29E-04
AM-243	7.38E3 Y	3.00E-04	7.37E-05	3.73E-04
AM-244	10.1 H	4.08E-03	8.85E-04	4.96E-03
AM-245	122.4 M	1.62E-04	7.27E-04	8.89E-04
AM-246	25.0 M	4.94E-03	1.16E-03	6.10E-03
CM-242	163.2 D	8.72E-06	2.20E-05	3.08E-05
CM-243	28.5 Y	6.69E-04	3.56E-04	1.02E-03
CM-244	18.11 Y	7.76E-06	1.88E-05	2.66E-05
CM-245	8.5E3 Y	3.89E-04	2.03E-04	5.92E-04
CM-246	4.75E3 Y	6.91E-06	1.78E-05	2.47E-05
CM-247	1.56E7 Y	1.59E-03	4.26E-05	1.63E-03
CM-248	3.39E5 Y	5.49E-06	1.39E-05	1.94E-05
CM-249	64.15 M	9.43E-05	6.91E-04	7.85E-04
CM-250	6.9E3 Y	0.0	3.15E-06	3.15E-06
BK-249	320 D	0.0	8.25E-05	8.25E-05
BK-250	3.222 H	4.47E-03	7.45E-04	5.22E-03
BK-251	57.0 M	0.0	9.04E-04	9.04E-04
CF-248	333.5 D	6.23E-06	1.30E-05	1.92E-05
CF-249	350.6 Y	1.67E-03	1.09E-04	1.78E-03
CF-250	13.08 Y	6.23E-06	1.30E-05	1.93E-05
CF-251	9.0E2 Y	6.15E-04	4.60E-04	1.08E-03
CF-252	2.639 Y	5.79E-06	1.23E-05	1.81E-05
CF-253	17.81 D	1.05E-07	1.97E-04	1.97E-04
CF-254	60.5 D	1.12E-10	0.0	1.12E-10
ES-253	20.467 D	5.12E-06	6.10E-06	1.12E-05

DOSE-RATE CONVERSION FACTORS FOR IMMERSION IN CONTAMINATED WATER

DOSE RATE AT BODY SURFACE FOR WATER CONCENTRATION OF 1 BQ PER CUBIC CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
ES-254	275.7 D	9.31E-05	1.41E-04	2.35E-04
ES-254M	39.3 H	2.82E-03	5.20E-04	3.34E-03
ES-255	39.8 D	4.58E-07	1.77E-04	1.78E-04
FM-254	3.240 H	6.61E-06	1.26E-05	1.92E-05
FM-255	20.07 H	5.82E-05	2.45E-04	3.03E-04
FM-256	157.6 M	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
H-3	12.28 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BE-7	53.44 D	1.26E-04	1.19E-04	1.32E-04	1.59E-04	1.16E-04	1.04E-04	1.23E-04	1.14E-04
BE-10	1.6E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C-11	20.48 M	2.58E-03	2.45E-03	2.73E-03	3.25E-03	2.39E-03	2.15E-03	2.54E-03	2.35E-03
C-14	5.73E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N-13	9.97 M	2.58E-03	2.45E-03	2.73E-03	3.25E-03	2.40E-03	2.15E-03	2.54E-03	2.35E-03
N-16	7.13 S	1.43E-02	1.45E-02	1.54E-02	1.85E-02	1.43E-02	1.37E-02	1.53E-02	1.43E-02
C-15	122.24 S	2.58E-03	2.45E-03	2.73E-03	3.26E-03	2.40E-03	2.16E-03	2.54E-03	2.35E-03
F-18	109.74 M	2.50E-03	2.38E-03	2.65E-03	3.15E-03	2.32E-03	2.09E-03	2.46E-03	2.28E-03
NA-22	2.602 Y	5.59E-03	5.46E-03	6.12E-03	6.98E-03	5.37E-03	4.90E-03	5.71E-03	5.27E-03
NA-24	15.00 H	1.15E-02	1.18E-02	1.31E-02	1.48E-02	1.18E-02	1.10E-02	1.25E-02	1.16E-02
MG-27	9.458 M	2.35E-03	2.28E-03	2.56E-03	2.87E-03	2.25E-03	2.04E-03	2.39E-03	2.20E-03
MG-28	20.91 H	3.49E-03	3.44E-03	3.87E-03	4.38E-03	3.40E-03	3.12E-03	3.62E-03	3.33E-03
AL-26	7.2E5 Y	7.11E-03	7.13E-03	7.98E-03	9.03E-03	7.06E-03	6.51E-03	7.51E-03	6.93E-03
AL-28	2.240 M	4.80E-03	4.92E-03	5.52E-03	6.11E-03	4.90E-03	4.56E-03	5.21E-03	4.81E-03
SI-31	157.3 M	2.27E-06	2.26E-06	2.55E-06	2.81E-06	2.24E-06	2.06E-06	2.38E-06	2.19E-06
SI-32	3.3E2 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-32	14.29 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-33	25.4 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S-35	87.44 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CL-36	3.01E5 Y	2.02E-12	3.64E-19	1.61E-13	1.58E-10	2.63E-13	3.39E-15	4.99E-15	8.29E-13
CL-38	37.21 M	4.13E-03	4.25E-03	4.75E-03	5.30E-03	4.24E-03	3.95E-03	4.51E-03	4.17E-03
AR-37	35.02 D	3.22E-10	5.81E-17	2.57E-11	2.52E-08	4.20E-11	5.41E-13	7.97E-13	1.32E-10
AR-39	269 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AR-41	1.827 H	3.29E-03	3.27E-03	3.69E-03	4.08E-03	3.24E-03	2.99E-03	3.45E-03	3.18E-03

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
H-3	12.28 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BE-7	53.44 D	1.23E-04	1.18E-04	1.27E-04	1.48E-04	1.30E-04	1.13E-04	1.02E-04	1.50E-04
BE-10	1.6E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C-11	20.48 M	2.54E-03	2.44E-03	2.61E-03	3.01E-03	2.68E-03	2.34E-03	2.10E-03	3.06E-03
C-14	5.73E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N-13	9.97 M	2.54E-03	2.44E-03	2.62E-03	3.01E-03	2.68E-03	2.34E-03	2.10E-03	3.06E-03
N-16	7.13 S	1.62E-02	1.45E-02	1.49E-02	1.56E-02	1.61E-02	1.30E-02	1.33E-02	1.58E-02
O-15	122.24 S	2.54E-03	2.44E-03	2.62E-03	3.01E-03	2.68E-03	2.34E-03	2.10E-03	3.06E-03
F-18	109.74 M	2.46E-03	2.36E-03	2.54E-03	2.92E-03	2.59E-03	2.27E-03	2.03E-03	2.96E-03
NA-22	2.602 Y	5.71E-03	5.43E-03	5.79E-03	6.32E-03	5.87E-03	5.19E-03	4.70E-03	6.42E-03
NA-24	15.00 H	1.27E-02	1.19E-02	1.24E-02	1.28E-02	1.27E-02	1.07E-02	1.04E-02	1.30E-02
MG-27	9.458 M	2.39E-03	2.26E-03	2.41E-03	2.60E-03	2.45E-03	2.20E-03	1.95E-03	2.65E-03
MG-28	20.91 H	3.62E-03	3.43E-03	3.64E-03	3.91E-03	3.68E-03	3.27E-03	2.97E-03	3.97E-03
AL-26	7.2E5 Y	7.53E-03	7.14E-03	7.55E-03	8.04E-03	7.65E-03	6.63E-03	6.18E-03	8.17E-03
AL-28	2.240 M	5.23E-03	4.94E-03	5.19E-03	5.35E-03	5.24E-03	4.53E-03	4.29E-03	5.44E-03
SI-31	157.3 M	2.38E-06	2.25E-06	2.39E-06	2.51E-06	2.41E-06	2.15E-06	1.95E-06	2.55E-06
SI-32	3.3E2 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-32	14.29 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-33	25.4 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S-35	87.44 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CL-36	3.01E5 Y	2.42E-15	1.96E-14	1.60E-12	9.58E-13	5.24E-13	7.91E-13	1.18E-12	2.59E-12
CL-38	37.21 M	4.54E-03	4.27E-03	4.49E-03	4.61E-03	4.54E-03	3.88E-03	3.72E-03	4.68E-03
AR-37	35.02 D	3.86E-13	3.13E-12	2.55E-10	1.53E-10	8.36E-11	1.26E-10	1.88E-10	4.14E-10
AR-39	269 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AR-41	1.827 H	3.44E-03	3.27E-03	3.46E-03	3.63E-03	3.49E-03	3.11E-03	2.83E-03	3.69E-03

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
H-3	12.28 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BE-7	53.44 D	1.95E-04	1.16E-04	1.17E-04	1.71E-04	1.29E-04	1.58E-04	1.03E-04	1.36E-04
BE-10	1.6E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C-11	20.48 M	4.01E-03	2.38E-03	2.40E-03	3.51E-03	2.66E-03	3.25E-03	2.13E-03	2.80E-03
C-14	5.73E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N-13	9.97 M	4.01E-03	2.38E-03	2.40E-03	3.51E-03	2.66E-03	3.25E-03	2.13E-03	2.80E-03
N-16	7.13 S	2.08E-02	1.41E-02	1.47E-02	1.99E-02	1.61E-02	1.80E-02	1.28E-02	1.57E-02
O-15	122.24 S	4.02E-03	2.38E-03	2.41E-03	3.51E-03	2.66E-03	3.25E-03	2.13E-03	2.80E-03
F-18	109.74 M	3.89E-03	2.31E-03	2.33E-03	3.40E-03	2.58E-03	3.15E-03	2.06E-03	2.71E-03
NA-22	2.602 Y	8.80E-03	5.27E-03	5.33E-03	7.67E-03	6.00E-03	7.20E-03	4.79E-03	6.16E-03
NA-24	15.00 H	1.81E-02	1.14E-02	1.17E-02	1.62E-02	1.28E-02	1.48E-02	1.06E-02	1.31E-02
MG-27	9.458 M	3.69E-03	2.19E-03	2.24E-03	3.19E-03	2.54E-03	3.05E-03	1.97E-03	2.57E-03
MG-28	20.91 H	5.55E-03	3.32E-03	3.36E-03	4.82E-03	3.82E-03	4.55E-03	3.03E-03	3.88E-03
AL-26	7.2E5 Y	1.13E-02	6.88E-03	6.97E-03	9.88E-03	7.73E-03	9.17E-03	6.38E-03	7.99E-03
AL-28	2.240 M	7.66E-03	4.74E-03	4.80E-03	6.73E-03	5.33E-03	6.26E-03	4.45E-03	5.48E-03
SI-31	157.3 M	3.61E-06	2.18E-06	2.20E-06	3.14E-06	2.51E-06	2.98E-06	2.00E-06	2.53E-06
SI-32	3.3E2 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-32	14.29 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-33	25.4 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S-35	87.44 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CL-36	3.01E5 Y	3.37E-10	4.55E-13	4.11E-13	1.46E-11	3.37E-16	1.01E-12	1.47E-16	2.02E-11
CL-38	37.21 M	6.57E-03	4.09E-03	4.17E-03	5.80E-03	4.59E-03	5.36E-03	3.86E-03	4.73E-03
AR-37	35.02 D	5.38E-08	7.27E-11	6.57E-11	2.34E-09	5.38E-14	1.61E-10	2.35E-14	3.22E-09
AR-39	269 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AR-41	1.827 H	5.22E-03	3.16E-03	3.19E-03	4.54E-03	3.63E-03	4.30E-03	2.90E-03	3.67E-03

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
K-40	1.277E9 Y	3.98E-04	4.01E-04	4.52E-04	4.99E-04	3.97E-04	3.68E-04	4.23E-04	3.90E-04
K-42	12.36 H	7.09E-04	7.17E-04	8.07E-04	8.92E-04	7.10E-04	6.59E-04	7.56E-04	6.98E-04
K-43	22.6 H	2.48E-03	2.34E-03	2.61E-03	3.13E-03	2.29E-03	2.07E-03	2.43E-03	2.25E-03
CA-41	1.03E5 Y	7.51E-10	1.35E-16	5.99E-11	5.88E-08	9.78E-11	1.26E-12	1.86E-12	3.08E-10
CA-45	162.7 D	6.06E-15	5.58E-19	6.50E-16	2.90E-13	9.88E-16	5.22E-17	7.93E-18	3.01E-15
CA-47	4.536 D	2.72E-03	2.70E-03	3.05E-03	3.38E-03	2.67E-03	2.46E-03	2.85E-03	2.62E-03
CA-49	8.719 M	9.25E-03	9.54E-03	1.05E-02	1.21E-02	9.55E-03	9.03E-03	1.01E-02	9.46E-03
SC-44	3.927 H	5.48E-03	5.32E-03	5.96E-03	6.82E-03	5.23E-03	4.76E-03	5.56E-03	5.13E-03
SC-46	83.80 D	5.26E-03	5.14E-03	5.79E-03	6.44E-03	5.08E-03	4.64E-03	5.41E-03	4.98E-03
SC-46M	18.72 S	2.30E-04	2.12E-04	2.27E-04	3.63E-04	2.09E-04	1.82E-04	2.24E-04	2.05E-04
SC-47	3.422 D	2.80E-04	2.57E-04	2.75E-04	4.28E-04	2.53E-04	2.22E-04	2.69E-04	2.49E-04
SC-48	43.67 H	8.74E-03	8.60E-03	9.69E-03	1.07E-02	8.51E-03	7.79E-03	9.06E-03	8.34E-03
SC-49	57.4 M	2.79E-06	2.85E-06	3.21E-06	3.55E-06	2.84E-06	2.64E-06	3.02E-06	2.79E-06
TI-44	47.3 Y	2.87E-04	3.06E-04	3.04E-04	6.13E-04	2.73E-04	2.43E-04	2.92E-04	2.60E-04
TI-45	3.08 H	2.20E-03	2.09E-03	2.33E-03	2.78E-03	2.05E-03	1.84E-03	2.17E-03	2.00E-03
TI-51	5.752 M	9.46E-04	8.83E-04	9.69E-04	1.24E-03	8.63E-04	7.76E-04	9.14E-04	8.53E-04
V-48	15.971 D	7.55E-03	7.41E-03	8.34E-03	9.35E-03	7.32E-03	6.69E-03	7.79E-03	7.17E-03
V-49	330 D	2.27E-09	4.09E-16	1.81E-10	1.78E-07	2.96E-10	3.81E-12	5.61E-12	9.32E-10
V-52	3.75 M	3.69E-03	3.71E-03	4.18E-03	4.62E-03	3.67E-03	3.40E-03	3.91E-03	3.61E-03
CR-49	42.09 M	2.63E-03	2.50E-03	2.77E-03	3.44E-03	2.44E-03	2.19E-03	2.59E-03	2.39E-03
CR-51	27.704 D	8.03E-05	7.42E-05	8.10E-05	1.07E-04	7.24E-05	6.50E-05	7.65E-05	7.17E-05
MN-52	5.591 D	8.93E-03	8.77E-03	9.87E-03	1.11E-02	8.67E-03	7.93E-03	9.22E-03	8.49E-03
MN-52M	21.4 M	6.13E-03	6.02E-03	6.76E-03	7.69E-03	5.93E-03	5.43E-03	6.31E-03	5.82E-03
MN-53	3.7E6 Y	4.22E-09	7.61E-16	3.37E-10	3.31E-07	5.50E-10	7.09E-12	1.04E-11	1.73E-09
MN-54	312.7 D	2.19E-03	2.12E-03	2.38E-03	2.68E-03	2.09E-03	1.89E-03	2.22E-03	2.04E-03

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
K-40	1.277E9 Y	4.23E-04	4.01E-04	4.23E-04	4.42E-04	4.27E-04	3.77E-04	3.48E-04	4.49E-04
K-42	12.36 H	7.57E-04	7.17E-04	7.56E-04	7.88E-04	7.63E-04	6.71E-04	6.22E-04	8.01E-04
K-43	22.6 H	2.43E-03	2.33E-03	2.50E-03	2.90E-03	2.56E-03	2.23E-03	2.01E-03	2.94E-03
CA-41	1.03E5 Y	9.00E-13	7.30E-12	5.94E-10	3.57E-10	1.95E-10	2.94E-10	4.39E-10	9.64E-10
CA-45	162.7 D	7.53E-17	2.08E-16	5.47E-15	4.73E-15	1.83E-15	2.82E-15	3.66E-15	8.[illegible]2E-15
CA-47	4.536 D	2.84E-03	2.70E-03	2.86E-03	3.02E-03	2.88E-03	2.57E-03	2.34E-03	3.07E-03
CA-49	8.719 M	1.04E-02	9.60E-03	9.98E-03	1.02E-02	1.03E-02	8.44E-03	8.52E-03	1.04E-02
SC-44	3.927 H	5.56E-03	5.29E-03	5.64E-03	6.20E-03	5.73E-03	5.08E-03	4.57E-03	6.30E-03
SC-46	83.80 D	5.40E-03	5.12E-03	5.44E-03	5.81E-03	5.51E-03	4.94E-03	4.42E-03	5.91E-03
SC-46M	18.72 S	2.15E-04	2.12E-04	2.33E-04	3.55E-04	2.14E-04	1.83E-04	1.76E-04	3.64E-04
SC-47	3.422 D	2.61E-04	2.56E-04	2.81E-04	4.15E-04	2.66E-04	2.23E-04	2.15E-04	4.26E-04
SC-48	43.67 H	9.04E-03	8.57E-03	9.10E-03	9.65E-03	9.19E-03	8.22E-03	7.41E-03	9.82E-03
SC-49	57.4 M	3.03E-06	2.86E-06	3.01E-06	3.11E-06	3.04E-06	2.64E-06	2.49E-06	3.16E-06
TI-44	47.3 Y	3.17E-04	3.04E-04	3.35E-04	5.87E-04	2.13E-04	2.50E-04	2.06E-04	6.03E-04
TI-45	3.08 H	2.17E-03	2.08E-03	2.23E-03	2.57E-03	2.28E-03	2.00E-03	1.79E-03	2.61E-03
TI-51	5.752 M	9.14E-04	8.78E-04	9.46E-04	1.15E-03	9.73E-04	8.17E-04	7.59E-04	1.17E-03
V-48	15.971 D	7.78E-03	7.38E-03	7.85E-03	8.42E-03	7.95E-03	7.07E-03	6.39E-03	8.56E-03
V-49	330 D	2.72E-12	2.21E-11	1.79E-09	1.08E-09	5.89E-10	8.89E-10	1.33E-09	2.91E-09
V-52	3.75 M	3.91E-03	3.71E-03	3.91E-03	4.09E-03	3.95E-03	3.49E-03	3.22E-03	4.16E-03
CR-49	42.09 M	2.59E-03	2.49E-03	2.68E-03	3.21E-03	2.69E-03	2.36E-03	2.12E-03	3.26E-03
CR-51	27.704 D	7.66E-05	7.38E-05	7.97E-05	9.99E-05	8.24E-05	6.79E-05	6.38E-05	1.02E-04
MN-52	5.591 D	9.21E-03	8.74E-03	9.29E-03	9.96E-03	9.41E-03	8.37E-03	7.56E-03	1.01E-02
MN-52M	21.4 M	6.31E-03	6.01E-03	6.38E-03	6.94E-03	6.48E-03	5.70E-03	5.19E-03	7.05E-03
MN-53	3.7E6 Y	5.06E-12	4.10E-11	3.34E-09	2.00E-09	1.10E-09	1.65E-09	2.47E-09	5.42E-09
MN-54	312.7 D	2.22E-03	2.11E-03	2.25E-03	2.44E-03	2.28E-03	2.05E-03	1.82E-03	2.48E-03

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
K-40	1.277E9 Y	6.34E-04	3.87E-04	3.90E-04	5.54E-04	4.42E-04	5.22E-04	3.58E-04	4.48E-04
K-42	12.36 H	1.13E-03	6.91E-04	6.98E-04	9.88E-04	7.87E-04	9.28E-04	6.42E-04	8.01E-04
K-43	22.6 H	3.83E-03	2.28E-03	2.30E-03	3.35E-03	2.57E-03	3.13E-03	2.04E-03	2.68E-03
CA-41	1.03E5 Y	1.25E-07	1.69E-10	1.53E-10	5.45E-09	1.25E-13	3.76E-10	5.48E-14	7.51E-09
CA-45	162.7 D	5.43E-13	1.91E-15	1.88E-15	4.23E-14	1.91E-17	5.32E-15	7.13E-19	4.76E-14
CA-47	4.536 D	4.32E-03	2.61E-03	2.64E-03	3.76E-03	3.00E-03	3.56E-03	2.39E-03	3.03E-03
CA-49	8.719 M	1.43E-02	9.23E-03	9.57E-03	1.31E-02	1.03E-02	1.17E-02	8.59E-03	1.05E-02
SC-44	3.927 H	8.60E-03	5.14E-03	5.21E-03	7.49E-03	5.86E-03	7.05E-03	4.64E-03	6.02E-03
SC-46	83.80 D	8.30E-03	4.95E-03	5.04E-03	7.18E-03	5.75E-03	6.85E-03	4.48E-03	5.79E-03
SC-46M	18.72 S	3.48E-04	2.12E-04	2.10E-04	3.25E-04	2.51E-04	3.21E-04	1.86E-04	2.54E-04
SC-47	3.422 D	4.19E-04	2.56E-04	2.54E-04	3.89E-04	2.99E-04	3.81E-04	2.26E-04	3.05E-04
SC-48	43.67 H	1.38E-02	8.29E-03	8.42E-03	1.20E-02	9.60E-03	1.14E-02	7.53E-03	9.67E-03
SC-49	57.4 M	4.45E-06	2.75E-06	2.79E-06	3.91E-06	3.10E-06	3.64E-06	2.58E-06	3.18E-06
TI-44	47.3 Y	5.55E-04	2.79E-04	2.85E-04	5.12E-04	3.99E-04	5.08E-04	2.44E-04	3.82E-04
TI-45	3.08 H	3.43E-03	2.03E-03	2.05E-03	3.00E-03	2.27E-03	2.77E-03	1.82E-03	2.39E-03
TI-51	5.752 M	1.44E-03	8.64E-04	8.68E-04	1.27E-03	9.72E-04	1.20E-03	7.73E-04	1.01E-03
V-48	15.971 D	1.19E-02	7.15E-03	7.25E-03	1.04E-02	8.21E-03	9.80E-03	6.50E-03	8.35E-03
V-49	330 D	3.79E-07	5.12E-10	4.63E-10	1.65E-08	3.79E-13	1.14E-09	1.66E-13	2.27E-08
V-52	3.75 M	5.87E-03	3.58E-03	3.61E-03	5.13E-03	4.09E-03	4.83E-03	3.31E-03	4.15E-03
CR-49	42.09 M	4.12E-03	2.43E-03	2.45E-03	3.62E-03	2.75E-03	3.38E-03	2.17E-03	2.88E-03
CR-51	27.704 D	1.22E-04	7.30E-05	7.29E-05	1.08E-04	8.14E-05	1.01E-04	6.52E-05	8.56E-05
MN-52	5.591 D	1.41E-02	8.46E-03	8.59E-03	1.23E-02	9.72E-03	1.16E-02	7.70E-03	9.88E-03
MN-52M	21.4 M	9.66E-03	5.82E-03	5.88E-03	8.44E-03	6.60E-03	7.90E-03	5.31E-03	6.79E-03
MN-53	3.7E6 Y	7.05E-07	9.52E-10	8.61E-10	3.06E-08	7.05E-13	2.11E-09	3.08E-13	4.22E-08
MN-54	312.7 D	3.45E-03	2.04E-03	2.08E-03	2.98E-03	2.36E-03	2.84E-03	1.83E-03	2.40E-03

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
MN-56	2.5785 H	4.57E-03	4.57E-03	5.13E-03	5.73E-03	4.54E-03	4.17E-03	4.83E-03	4.45E-03
MN-57	1.47 M	1.84E-04	1.77E-04	1.96E-04	2.46E-04	1.74E-04	1.57E-04	1.85E-04	1.70E-04
FE-52	8.275 H	1.87E-03	1.76E-03	1.94E-03	2.46E-03	1.72E-03	1.54E-03	1.83E-03	1.69E-03
FE-55	2.7 Y	5.57E-09	1.00E-15	4.44E-10	4.36E-07	7.25E-10	9.35E-12	1.38E-11	2.29E-09
FE-59	44.63 D	3.07E-03	3.04E-03	3.43E-03	3.79E-03	3.01E-03	2.76E-03	3.20E-03	2.95E-03
CO-56	78.76 D	9.75E-03	9.75E-03	1.09E-02	1.23E-02	9.69E-03	8.95E-03	1.03E-02	9.51E-03
CO-57	270.9 D	3.05E-04	2.84E-04	3.03E-04	5.05E-04	2.79E-04	2.42E-04	3.00E-04	2.72E-04
CO-58	70.80 D	2.54E-03	2.45E-03	2.75E-03	3.12E-03	2.41E-03	2.18E-03	2.56E-03	2.36E-03
CO-58M	9.15 H	9.98E-09	2.11E-09	1.46E-09	6.43E-07	1.93E-09	9.06E-10	2.66E-09	4.80E-09
CO-60	5.271 Y	6.44E-03	6.40E-03	7.22E-03	7.97E-03	6.33E-03	5.83E-03	6.74E-03	6.21E-03
CO-60M	10.47 M	1.04E-05	1.07E-05	1.15E-05	1.61E-05	1.01E-05	9.36E-06	1.09E-05	9.92E-06
CO-61	1.650 H	1.98E-04	2.07E-04	2.13E-04	3.58E-04	1.89E-04	1.71E-04	2.02E-04	1.82E-04
NI-56	6.10 D	4.46E-03	4.29E-03	4.79E-03	5.66E-03	4.23E-03	3.82E-03	4.49E-03	4.14E-03
NI-57	36.08 H	4.97E-03	4.95E-03	5.56E-03	6.26E-03	4.90E-03	4.51E-03	5.21E-03	4.80E-03
NI-59	7.5E4 Y	9.40E-09	1.69E-15	7.49E-10	7.36E-07	1.22E-09	1.58E-11	2.32E-11	3.86E-09
NI-63	100.1 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NI-65	2.520 H	1.41E-03	1.41E-03	1.59E-03	1.76E-03	1.40E-03	1.29E-03	1.49E-03	1.37E-03
CU-61	3.408 H	2.09E-03	1.99E-03	2.22E-03	2.64E-03	1.95E-03	1.75E-03	2.07E-03	1.91E-03
CU-62	9.74 M	2.55E-03	2.42E-03	2.70E-03	3.21E-03	2.37E-03	2.13E-03	2.51E-03	2.32E-03
CU-64	12.701 H	4.79E-04	4.56E-04	5.08E-04	6.04E-04	4.46E-04	4.01E-04	4.73E-04	4.37E-04
CU-67	61.88 D	2.90E-04	2.68E-04	2.86E-04	4.47E-04	2.61E-04	2.31E-04	2.78E-04	2.58E-04
ZN-62	9.26 H	1.13E-03	1.08E-03	1.20E-03	1.45E-03	1.05E-03	9.47E-04	1.12E-03	1.03E-03
ZN-65	244.4 D	1.51E-03	1.49E-03	1.67E-03	1.86E-03	1.47E-03	1.34E-03	1.56E-03	1.44E-03
ZN-69	55.6 M	1.52E-08	1.42E-08	1.57E-08	1.95E-08	1.39E-08	1.25E-08	1.47E-08	1.37E-08
ZN-69M	13.76 H	1.05E-03	9.89E-04	1.10E-03	1.34E-03	9.65E-04	8.67E-04	1.02E-03	9.49E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
MN-56	2.5785 H	4.84E-03	4.57E-03	4.83E-03	5.09E-03	4.90E-03	4.29E-03	3.96E-03	5.18E-03
MN-57	1.47 M	1.84E-04	1.76E-04	1.89E-04	2.27E-04	1.87E-04	1.65E-04	1.59E-04	2.31E-04
FE-52	8.275 H	1.82E-03	1.75E-03	1.89E-03	2.30E-03	1.91E-03	1.65E-03	1.50E-03	2.34E-03
FE-55	2.7 Y	6.67E-12	5.41E-11	4.40E-09	2.64E-09	1.45E-09	2.18E-09	3.25E-09	7.15E-09
FE-59	44.63 D	3.19E-03	3.03E-03	3.21E-03	3.40E-03	3.24E-03	2.90E-03	2.62E-03	3.46E-03
CO-56	78.76 D	1.04E-02	9.75E-03	1.03E-02	1.08E-02	1.05E-02	9.09E-03	8.49E-03	1.10E-02
CO-57	270.9 D	2.88E-04	2.84E-04	3.14E-04	4.93E-04	2.74E-04	2.45E-04	2.31E-04	5.07E-04
CO-58	70.80 D	2.56E-03	2.43E-03	2.60E-03	2.85E-03	2.64E-03	2.36E-03	2.10E-03	2.90E-03
CO-58M	9.15 H	4.08E-09	1.49E-09	8.81E-09	7.73E-09	2.95E-09	4.85E-09	5.88E-09	1.45E-08
CO-60	5.271 Y	6.73E-03	6.38E-03	6.76E-03	7.11E-03	6.82E-03	6.08E-03	5.53E-03	7.23E-03
CO-60M	10.47 M	1.13E-05	1.06E-05	1.13E-05	1.37E-05	1.02E-05	9.73E-06	8.62E-06	1.40E-05
CO-61	1.650 H	2.16E-04	2.05E-04	2.22E-04	3.33E-04	1.70E-04	1.80E-04	1.51E-04	3.41E-04
NI-56	6.10 D	4.47E-03	4.27E-03	4.57E-03	5.19E-03	4.62E-03	4.07E-03	3.68E-03	5.29E-03
NI-57	36.08 H	5.21E-03	4.94E-03	5.24E-03	5.59E-03	5.29E-03	4.65E-03	4.28E-03	5.68E-03
NI-59	7.5E4 Y	1.13E-11	9.14E-11	7.43E-09	4.46E-09	2.44E-09	3.68E-09	5.49E-09	1.21E-08
NI-63	100.1 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NI-65	2.520 H	1.48E-03	1.41E-03	1.49E-03	1.57E-03	1.50E-03	1.33E-03	1.22E-03	1.59E-03
CU-61	3.408 H	2.07E-03	1.98E-03	2.12E-03	2.44E-03	2.17E-03	1.90E-03	1.70E-03	2.47E-03
CU-62	9.74 M	2.51E-03	2.41E-03	2.58E-03	2.97E-03	2.64E-03	2.31E-03	2.07E-03	3.02E-03
CU-64	12.701 H	4.73E-04	4.53E-04	4.86E-04	5.58E-04	4.97E-04	4.35E-04	3.90E-04	5.67E-04
CU-67	61.88 D	2.75E-04	2.68E-04	2.93E-04	4.29E-04	2.75E-04	2.33E-04	2.23E-04	4.40E-04
ZN-62	9.26 H	1.12E-03	1.07E-03	1.15E-03	1.33E-03	1.17E-03	1.03E-03	9.18E-04	1.35E-03
ZN-65	244.4 D	1.56E-03	1.48E-03	1.57E-03	1.67E-03	1.59E-03	1.42E-03	1.28E-03	1.70E-03
ZN-69	55.6 M	1.47E-08	1.41E-08	1.52E-08	1.81E-08	1.57E-08	1.33E-08	1.22E-08	1.84E-08
ZN-69M	13.76 H	1.02E-03	9.83E-04	1.06E-03	1.25E-03	1.09E-03	9.33E-04	8.48E-04	1.27E-03

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
MN-56	2.5785 H	7.23E-03	4.40E-03	4.49E-03	6.32E-03	5.01E-03	5.93E-03	4.06E-03	5.12E-03
MN-57	1.47 M	2.90E-04	1.72E-04	1.74E-04	2.54E-04	1.98E-04	2.42E-04	1.54E-04	2.03E-04
FE-52	8.275 H	2.88E-03	1.72E-03	1.73E-03	2.55E-03	1.94E-03	2.39E-03	1.53E-03	2.03E-03
FE-55	2.7 Y	9.30E-07	1.26E-09	1.14E-09	4.04E-08	9.30E-13	2.79E-09	4.06E-13	5.57E-08
FE-59	44.63 D	4.87E-03	2.93E-03	2.97E-03	4.23E-03	3.39E-03	4.02E-03	2.67E-03	3.41E-03
CO-56	78.76 D	1.53E-02	9.41E-03	9.61E-03	1.35E-02	1.07E-02	1.26E-02	8.65E-03	1.09E-02
CO-57	270.9 D	4.75E-04	2.82E-04	2.80E-04	4.42E-04	3.41E-04	4.39E-04	2.47E-04	3.44E-04
CO-58	70.80 D	3.99E-03	2.36E-03	2.41E-03	3.45E-03	2.71E-03	3.27E-03	2.12E-03	2.77E-03
CO-58M	9.15 H	1.35E-06	3.24E-09	3.28E-09	6.76E-08	1.95E-09	9.22E-09	3.71E-10	8.63E-08
CO-60	5.271 Y	1.02E-02	6.17E-03	6.24E-03	8.88E-03	7.11E-03	8.43E-03	5.65E-03	7.18E-03
CO-60M	10.47 M	1.93E-05	1.00E-05	1.02E-05	1.57E-05	1.23E-05	1.49E-05	9.07E-06	1.24E-05
CO-61	1.650 H	3.65E-04	1.90E-04	1.95E-04	3.26E-04	2.55E-04	3.18E-04	1.68E-04	2.49E-04
NI-56	6.10 D	6.96E-03	4.16E-03	4.21E-03	6.09E-03	4.77E-03	5.77E-03	3.74E-03	4.88E-03
NI-57	36.08 H	7.86E-03	4.78E-03	4.83E-03	6.88E-03	5.43E-03	6.45E-03	4.40E-03	5.56E-03
NI-59	7.5E4 Y	1.57E-06	2.12E-09	1.92E-09	6.82E-08	1.57E-12	4.70E-09	6.86E-13	9.40E-08
NI-63	100.1 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NI-65	2.520 H	2.24E-03	1.36E-03	1.37E-03	1.95E-03	1.56E-03	1.85E-03	1.25E-03	1.58E-03
CU-61	3.408 H	3.25E-03	1.93E-03	1.95E-03	2.84E-03	2.17E-03	2.65E-03	1.73E-03	2.27E-03
CU-62	9.74 M	3.96E-03	2.35E-03	2.38E-03	3.47E-03	2.63E-03	3.21E-03	2.10E-03	2.76E-03
CU-64	12.701 H	7.46E-04	4.42E-04	4.47E-04	6.52E-04	4.94E-04	6.04E-04	3.96E-04	5.20E-04
CU-67	61.88 D	4.43E-04	2.65E-04	2.64E-04	4.08E-04	3.13E-04	3.97E-04	2.35E-04	3.19E-04
ZN-62	9.26 H	1.78E-03	1.04E-03	1.06E-03	1.55E-03	1.18E-03	1.44E-03	9.32E-04	1.23E-03
ZN-65	244.4 D	2.39E-03	1.43E-03	1.45E-03	2.07E-03	1.66E-03	1.97E-03	1.30E-03	1.67E-03
ZN-69	55.6 M	2.32E-08	1.39E-08	1.40E-08	2.05E-08	1.54E-08	1.90E-08	1.24E-08	1.63E-08
ZN-69M	13.76 H	1.62E-03	9.64E-04	9.70E-04	1.42E-03	1.07E-03	1.32E-03	8.62E-04	1.13E-03

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
GA-66	9.40 H	6.86E-03	6.89E-03	7.63E-03	8.77E-03	6.84E-03	6.36E-03	7.27E-03	6.74E-03
GA-67	3.261 D	3.63E-04	3.39E-04	3.64E-04	5.43E-04	3.29E-04	2.92E-04	3.50E-04	3.23E-04
GA-68	68.0 M	2.41E-03	2.29E-03	2.55E-03	3.03E-03	2.24E-03	2.02E-03	2.38E-03	2.19E-03
GA-72	14.1 H	7.39E-03	7.41E-03	8.29E-03	9.31E-03	7.36E-03	6.79E-03	7.83E-03	7.22E-03
GE-68	288 D	2.25E-08	5.09E-15	1.80E-09	1.74E-06	2.94E-09	3.92E-11	5.30E-11	9.26E-09
GE-71	11.8 D	2.27E-08	5.15E-15	1.82E-09	1.76E-06	2.97E-09	3.97E-11	5.36E-11	9.36E-09
GE-77	11.30 H	2.75E-03	2.62E-03	2.91E-03	3.54E-03	2.58E-03	2.34E-03	2.74E-03	2.54E-03
AS-72	26.0 H	4.62E-03	4.45E-03	4.98E-03	5.76E-03	4.37E-03	3.96E-03	4.65E-03	4.28E-03
AS-73	80.30 D	8.21E-06	9.72E-06	8.35E-06	2.72E-05	7.40E-06	7.01E-06	8.37E-06	7.34E-06
AS-74	17.77 D	1.95E-03	1.86E-03	2.07E-03	2.43E-03	1.82E-03	1.64E-03	1.93E-03	1.78E-03
AS-76	26.32 H	1.11E-03	1.07E-03	1.20E-03	1.38E-03	1.05E-03	9.56E-04	1.12E-03	1.03E-03
AS-77	38.8 H	2.19E-05	2.04E-05	2.22E-05	2.97E-05	1.99E-05	1.78E-05	2.10E-05	1.96E-05
SE-73	7.15 H	2.74E-03	2.60E-03	2.87E-03	3.59E-03	2.53E-03	2.27E-03	2.68E-03	2.48E-03
SE-75	119.78 D	9.86E-04	9.09E-04	9.83E-04	1.41E-03	8.89E-04	7.90E-04	9.44E-04	8.78E-04
SE-79	6.5E4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BR-77	57.04 H	8.04E-04	7.57E-04	8.37E-04	1.04E-03	7.41E-04	6.66E-04	7.86E-04	7.28E-04
BR-80	17.4 M	1.91E-04	1.82E-04	2.04E-04	2.38E-04	1.78E-04	1.61E-04	1.90E-04	1.75E-04
BR-80M	4.42 H	1.02E-05	1.52E-05	7.73E-06	5.04E-05	7.25E-06	8.20E-06	1.16E-05	8.71E-06
BR-82	35.30 H	6.84E-03	6.64E-03	7.46E-03	8.45E-03	6.55E-03	5.95E-03	6.96E-03	6.41E-03
BR-83	2.39 H	1.89E-05	1.80E-05	2.00E-05	2.37E-05	1.76E-05	1.58E-05	1.87E-05	1.72E-05
BR-84	31.80 M	4.97E-03	5.03E-03	5.59E-03	6.33E-03	5.01E-03	4.66E-03	5.32E-03	4.93E-03
BR-85	172 S	1.74E-04	1.70E-04	1.91E-04	2.14E-04	1.68E-04	1.53E-04	1.79E-04	1.64E-04
KR-79	35.04 H	6.42E-04	6.06E-04	6.71E-04	8.28E-04	5.93E-04	5.33E-04	6.29E-04	5.83E-04
KR-81	2.1E5 Y	2.55E-05	2.33E-05	2.52E-05	3.82E-05	2.27E-05	2.04E-05	2.40E-05	2.26E-05
KR-83M	1.83 H	4.11E-08	1.08E-08	8.53E-09	1.60E-06	1.03E-08	5.74E-09	8.56E-09	2.32E-08

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
GA-66	9.40 H	7.38E-03	6.89E-03	7.25E-03	7.67E-03	7.45E-03	6.31E-03	6.04E-03	7.79E-03
GA-67	3.261 D	3.48E-04	3.38E-04	3.68E-04	5.16E-04	3.49E-04	3.00E-04	2.81E-04	5.28E-04
GA-68	68.0 M	2.38E-03	2.28E-03	2.44E-03	2.80E-03	2.50E-03	2.19E-03	1.96E-03	2.85E-03
GA-72	14.1 H	7.87E-03	7.41E-03	7.83E-03	8.23E-03	7.96E-03	6.90E-03	6.44E-03	8.37E-03
GE-68	288 D	2.85E-11	2.25E-10	1.78E-08	1.08E-08	5.85E-09	8.82E-09	1.31E-08	2.89E-08
GE-71	11.8 D	2.88E-11	2.27E-10	1.80E-08	1.09E-08	5.91E-09	8.92E-09	1.33E-08	2.92E-08
GE-77	11.30 H	2.73E-03	2.61E-03	2.80E-03	3.25E-03	2.85E-03	2.45E-03	2.26E-03	3.31E-03
AS-72	26.0 H	4.64E-03	4.43E-03	4.73E-03	5.26E-03	4.82E-03	4.25E-03	3.82E-03	5.35E-03
AS-73	80.30 D	1.08E-05	9.29E-06	1.04E-05	1.88E-05	5.20E-06	7.55E-06	5.59E-06	1.93E-05
AS-74	17.77 D	1.93E-03	1.85E-03	1.98E-03	2.25E-03	2.02E-03	1.78E-03	1.59E-03	2.28E-03
AS-76	26.32 H	1.12E-03	1.07E-03	1.14E-03	1.26E-03	1.16E-03	1.02E-03	9.20E-04	1.28E-03
AS-77	38.8 H	2.10E-05	2.03E-05	2.19E-05	2.79E-05	2.22E-05	1.86E-05	1.74E-05	2.84E-05
SE-73	7.15 H	2.69E-03	2.58E-03	2.78E-03	3.34E-03	2.80E-03	2.44E-03	2.20E-03	3.39E-03
SE-75	119.78 D	9.34E-04	9.06E-04	9.85E-04	1.34E-03	9.75E-04	8.12E-04	7.71E-04	1.37E-03
SE-79	6.5E4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BR-77	57.04 H	7.85E-04	7.53E-04	8.10E-04	9.65E-04	8.26E-04	7.11E-04	6.48E-04	9.82E-04
BR-80	17.4 M	1.89E-04	1.81E-04	1.94E-04	2.19E-04	1.98E-04	1.75E-04	1.56E-04	2.22E-04
BR-80M	4.42 H	2.07E-05	1.18E-05	1.35E-05	2.37E-05	5.43E-06	9.81E-06	6.51E-06	2.43E-05
BR-82	35.30 H	6.95E-03	6.61E-03	7.05E-03	7.67E-03	7.15E-03	6.37E-03	5.71E-03	7.80E-03
BR-83	2.39 H	1.86E-05	1.79E-05	1.92E-05	2.19E-05	1.96E-05	1.72E-05	1.54E-05	2.23E-05
BR-84	31.80 M	5.40E-03	5.04E-03	5.29E-03	5.51E-03	5.42E-03	4.61E-03	4.42E-03	5.59E-03
BR-85	172 S	1.78E-04	1.69E-04	1.80E-04	1.94E-04	1.83E-04	1.63E-04	1.46E-04	1.97E-04
KR-79	35.04 H	6.28E-04	6.02E-04	6.47E-04	7.64E-04	6.62E-04	5.70E-04	5.19E-04	7.77E-04
KR-81	2.1E5 Y	2.40E-05	2.32E-05	2.52E-05	3.25E-05	2.58E-05	2.10E-05	2.01E-05	3.32E-05
KR-83M	1.83 H	1.75E-08	9.46E-09	4.07E-08	4.45E-08	1.40E-08	2.32E-08	2.50E-08	6.76E-08

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
GA-66	9.40 H	1.07E-02	6.66E-03	6.84E-03	9.54E-03	7.48E-03	8.75E-03	6.12E-03	7.69E-03
GA-67	3.261 D	5.65E-04	3.33E-04	3.32E-04	5.10E-04	3.89E-04	4.91E-04	2.95E-04	4.00E-04
GA-68	68.0 M	3.75E-03	2.22E-03	2.25E-03	3.27E-03	2.48E-03	3.04E-03	1.99E-03	2.61E-03
GA-72	14.1 H	1.17E-02	7.14E-03	7.29E-03	1.02E-02	8.09E-03	9.54E-03	6.59E-03	8.29E-03
GE-68	288 D	3.70E-06	5.10E-09	4.62E-09	1.63E-07	4.07E-12	1.14E-08	1.62E-12	2.23E-07
GE-71	11.8 D	3.74E-06	5.16E-09	4.67E-09	1.65E-07	4.12E-12	1.15E-08	1.64E-12	2.26E-07
GE-77	11.30 H	4.25E-03	2.55E-03	2.58E-03	3.74E-03	2.90E-03	3.53E-03	2.30E-03	2.99E-03
AS-72	26.0 H	7.22E-03	4.30E-03	4.37E-03	6.30E-03	4.88E-03	5.89E-03	3.87E-03	5.05E-03
AS-73	80.30 D	3.09E-05	7.98E-06	8.40E-06	1.84E-05	1.30E-05	1.69E-05	6.61E-06	1.35E-05
AS-74	17.77 D	3.04E-03	1.80E-03	1.82E-03	2.65E-03	2.03E-03	2.47E-03	1.61E-03	2.12E-03
AS-76	26.32 H	1.73E-03	1.04E-03	1.05E-03	1.51E-03	1.17E-03	1.41E-03	9.35E-04	1.21E-03
AS-77	38.8 H	3.33E-05	2.00E-05	2.00E-05	2.97E-05	2.26E-05	2.81E-05	1.78E-05	2.36E-05
SE-73	7.15 H	4.28E-03	2.52E-03	2.54E-03	3.77E-03	2.85E-03	3.51E-03	2.25E-03	2.99E-03
SE-75	119.78 D	1.49E-03	8.99E-04	8.95E-04	1.35E-03	1.03E-03	1.29E-03	7.98E-04	1.06E-03
SE-79	6.5E4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BR-77	57.04 H	1.24E-03	7.38E-04	7.44E-04	1.09E-03	8.32E-04	1.02E-03	6.60E-04	8.68E-04
BR-80	17.4 M	2.98E-04	1.76E-04	1.79E-04	2.59E-04	1.99E-04	2.42E-04	1.58E-04	2.07E-04
BR-80M	4.42 H	5.70E-05	9.27E-06	1.03E-05	3.31E-05	1.90E-05	2.60E-05	7.03E-06	2.23E-05
BR-82	35.30 H	1.08E-02	6.41E-03	6.51E-03	9.34E-03	7.35E-03	8.82E-03	5.79E-03	7.51E-03
BR-83	2.39 H	2.94E-05	1.74E-05	1.76E-05	2.57E-05	1.95E-05	2.38E-05	1.56E-05	2.05E-05
BR-84	31.80 M	7.77E-03	4.85E-03	4.98E-03	6.93E-03	5.48E-03	6.38E-03	4.48E-03	5.60E-03
BR-85	172 S	2.74E-04	1.64E-04	1.67E-04	2.38E-04	1.89E-04	2.26E-04	1.48E-04	1.92E-04
KR-79	35.04 H	9.96E-04	5.90E-04	5.95E-04	8.70E-04	6.64E-04	8.15E-04	5.28E-04	6.94E-04
KR-81	2.1E5 Y	4.51E-05	2.30E-05	2.29E-05	3.46E-05	2.58E-05	3.23E-05	2.05E-05	2.76E-05
KR-83M	1.83 H	2.96E-06	1.74E-08	1.82E-08	2.61E-07	1.31E-08	5.18E-08	3.94E-09	2.76E-07

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
KR-85	10.72 Y	5.65E-06	5.36E-06	5.98E-06	7.12E-06	5.24E-06	4.72E-06	5.56E-06	5.14E-06
KR-85M	4.48 H	4.05E-04	3.72E-04	4.00E-04	6.05E-04	3.66E-04	3.22E-04	3.89E-04	3.60E-04
KR-87	76.3 M	2.18E-03	2.18E-03	2.43E-03	2.80E-03	2.17E-03	2.01E-03	2.30E-03	2.14E-03
KR-88	2.84 H	5.46E-03	5.58E-03	6.22E-03	7.03E-03	5.57E-03	5.18E-03	5.92E-03	5.48E-03
KR-89	3.16 M	4.97E-03	4.99E-03	5.55E-03	6.34E-03	4.95E-03	4.59E-03	5.27E-03	4.87E-03
KR-90	32.32 S	3.33E-03	3.29E-03	3.68E-03	4.22E-03	3.25E-03	2.98E-03	3.46E-03	3.19E-03
RB-81	4.58 H	1.54E-03	1.45E-03	1.60E-03	2.01E-03	1.41E-03	1.27E-03	1.50E-03	1.39E-03
RB-82	1.25 M	2.78E-03	2.64E-03	2.95E-03	3.49E-03	2.59E-03	2.33E-03	2.75E-03	2.54E-03
RB-83	86.2 D	1.26E-03	1.20E-03	1.34E-03	1.59E-03	1.18E-03	1.06E-03	1.25E-03	1.15E-03
RB-84	32.9 D	2.33E-03	2.25E-03	2.52E-03	2.88E-03	2.22E-03	2.01E-03	2.36E-03	2.17E-03
RB-86	18.66 D	2.48E-04	2.43E-04	2.74E-04	3.03E-04	2.40E-04	2.20E-04	2.56E-04	2.35E-04
RB-87	4.73E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RB-88	17.8 M	1.74E-03	1.77E-03	1.98E-03	2.21E-03	1.76E-03	1.63E-03	1.87E-03	1.73E-03
RB-89	15.44 M	5.59E-03	5.60E-03	6.28E-03	7.01E-03	5.57E-03	5.14E-03	5.92E-03	5.46E-03
RB-90	157 S	6.21E-03	6.31E-03	6.90E-03	8.03E-03	6.28E-03	5.94E-03	6.68E-03	6.24E-03
RB-90M	258 S	9.07E-03	9.15E-03	1.02E-02	1.15E-02	9.11E-03	8.48E-03	9.68E-03	8.98E-03
SR-82	25.0 D	1.52E-07	2.72E-10	1.95E-08	5.72E-06	2.83E-08	3.00E-09	5.76E-10	8.19E-08
SR-85	64.84 D	1.29E-03	1.23E-03	1.37E-03	1.63E-03	1.20E-03	1.08E-03	1.27E-03	1.18E-03
SR-85M	67.66 M	5.51E-04	5.03E-04	5.41E-04	7.82E-04	4.91E-04	4.39E-04	5.20E-04	4.88E-04
SR-87M	2.805 H	8.09E-04	7.55E-04	8.32E-04	1.05E-03	7.37E-04	6.62E-04	7.81E-04	7.27E-04
SR-89	50.55 D	3.60E-07	3.49E-07	3.93E-07	4.39E-07	3.45E-07	3.13E-07	3.68E-07	3.38E-07
SR-90	28.6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SR-91	9.5 H	1.80E-03	1.75E-03	1.96E-03	2.20E-03	1.72E-03	1.57E-03	1.83E-03	1.69E-03
SR-92	2.71 H	3.42E-03	3.42E-03	3.86E-03	4.27E-03	3.39E-03	3.13E-03	3.61E-03	3.32E-03
SR-93	7.3 M	5.90E-03	5.81E-03	6.50E-03	7.39E-03	5.74E-03	5.25E-03	6.11E-03	5.63E-03

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
KR-85	10.72 Y	5.56E-06	5.33E-06	5.72E-06	6.59E-06	5.86E-06	5.12E-06	4.59E-06	6.69E-06
KR-85M	4.48 H	3.80E-04	3.71E-04	4.06E-04	5.83E-04	3.89E-04	3.27E-04	3.13E-04	5.97E-04
KR-87	76.3 M	2.33E-03	2.19E-03	2.31E-03	2.47E-03	2.36E-03	2.00E-03	1.91E-03	2.51E-03
KR-88	2.84 H	5.97E-03	5.61E-03	5.90E-03	6.13E-03	5.99E-03	5.09E-03	4.89E-03	6.23E-03
KR-89	3.16 M	5.31E-03	4.99E-03	5.26E-03	5.57E-03	5.37E-03	4.60E-03	4.36E-03	5.67E-03
KR-90	32.32 S	3.46E-03	3.28E-03	3.49E-03	3.79E-03	3.52E-03	3.09E-03	2.84E-03	3.85E-03
RB-81	4.58 H	1.50E-03	1.44E-03	1.55E-03	1.87E-03	1.58E-03	1.36E-03	1.24E-03	1.90E-03
RB-82	1.25 M	2.75E-03	2.63E-03	2.82E-03	3.23E-03	2.88E-03	2.53E-03	2.26E-03	3.28E-03
RB-83	86.2 D	1.25E-03	1.19E-03	1.28E-03	1.47E-03	1.31E-03	1.15E-03	1.03E-03	1.49E-03
RB-84	32.9 D	2.35E-03	2.24E-03	2.39E-03	2.63E-03	2.43E-03	2.16E-03	1.93E-03	2.67E-03
RB-86	18.66 D	2.55E-04	2.42E-04	2.57E-04	2.73E-04	2.60E-04	2.33E-04	2.09E-04	2.78E-04
RB-87	4.73E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RB-88	17.8 M	1.88E-03	1.77E-03	1.87E-03	1.94E-03	1.89E-03	1.63E-03	1.54E-03	1.97E-03
RB-89	15.44 M	5.95E-03	5.60E-03	5.92E-03	6.19E-03	6.00E-03	5.23E-03	4.87E-03	6.30E-03
RB-90	157 S	6.90E-03	6.32E-03	6.58E-03	6.82E-03	6.87E-03	5.65E-03	5.64E-03	6.92E-03
RB-90M	258 S	9.83E-03	9.17E-03	9.62E-03	1.00E-02	9.87E-03	8.39E-03	8.04E-03	1.02E-02
SR-82	25.0 D	6.52E-09	9.56E-09	1.45E-07	1.44E-07	4.88E-08	7.79E-08	9.24E-08	2.37E-07
SR-85	64.84 D	1.27E-03	1.22E-03	1.31E-03	1.51E-03	1.34E-03	1.17E-03	1.05E-03	1.53E-03
SR-85M	67.66 M	5.18E-04	5.02E-04	5.45E-04	7.40E-04	5.50E-04	4.45E-04	4.30E-04	7.56E-04
SR-87M	2.805 H	7.81E-04	7.51E-04	8.09E-04	9.77E-04	8.35E-04	7.05E-04	6.49E-04	9.93E-04
SR-89	50.55 D	3.66E-07	3.47E-07	3.70E-07	3.98E-07	3.75E-07	3.37E-07	3.00E-07	4.05E-07
SR-90	28.6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SR-91	9.5 H	1.83E-03	1.74E-03	1.85E-03	2.00E-03	1.88E-03	1.68E-03	1.50E-03	2.03E-03
SR-92	2.71 H	3.60E-03	3.42E-03	3.61E-03	3.80E-03	3.65E-03	3.23E-03	2.96E-03	3.86E-03
SR-93	7.3 M	6.11E-03	5.79E-03	6.15E-03	6.64E-03	6.24E-03	5.48E-03	5.02E-03	6.75E-03

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
KR-85	10.72 Y	8.78E-06	5.21E-06	5.26E-06	7.68E-06	5.82E-06	7.11E-06	4.66E-06	6.13E-06
KR-85M	4.48 H	6.09E-04	3.70E-04	3.67E-04	5.59E-04	4.29E-04	5.44E-04	3.27E-04	4.40E-04
KR-87	76.3 M	3.41E-03	2.11E-03	2.16E-03	3.03E-03	2.36E-03	2.78E-03	1.96E-03	2.45E-03
KR-88	2.84 H	8.63E-03	5.38E-03	5.50E-03	7.65E-03	6.04E-03	7.06E-03	5.05E-03	6.22E-03
KR-89	3.16 M	7.79E-03	4.82E-03	4.92E-03	6.91E-03	5.44E-03	6.40E-03	4.44E-03	5.58E-03
KR-90	32.32 S	5.24E-03	3.18E-03	3.22E-03	4.60E-03	3.63E-03	4.33E-03	2.91E-03	3.70E-03
RB-81	4.58 H	2.38E-03	1.41E-03	1.42E-03	2.09E-03	1.59E-03	1.96E-03	1.26E-03	1.66E-03
RB-82	1.25 M	4.33E-03	2.57E-03	2.59E-03	3.78E-03	2.87E-03	3.51E-03	2.30E-03	3.02E-03
RB-83	86.2 D	1.98E-03	1.17E-03	1.18E-03	1.72E-03	1.31E-03	1.60E-03	1.04E-03	1.37E-03
RB-84	32.9 D	3.66E-03	2.17E-03	2.21E-03	3.17E-03	2.49E-03	3.00E-03	1.95E-03	2.55E-03
RB-86	18.66 D	3.91E-04	2.34E-04	2.38E-04	3.39E-04	2.72E-04	3.23E-04	2.12E-04	2.73E-04
RB-87	4.73E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RB-88	17.8 M	2.76E-03	1.70E-03	1.74E-03	2.43E-03	1.92E-03	2.26E-03	1.59E-03	1.97E-03
RB-89	15.44 M	8.82E-03	5.40E-03	5.51E-03	7.74E-03	6.16E-03	7.25E-03	4.98E-03	6.27E-03
RB-90	157 S	9.46E-03	6.12E-03	6.35E-03	8.69E-03	6.88E-03	7.85E-03	5.60E-03	6.97E-03
RB-90M	258 S	1.41E-02	8.84E-03	9.08E-03	1.26E-02	9.99E-03	1.16E-02	8.14E-03	1.02E-02
SR-82	25.0 D	1.01E-05	5.94E-08	5.66E-08	1.03E-06	1.92E-09	1.70E-07	5.39E-11	1.05E-06
SR-85	64.84 D	2.02E-03	1.19E-03	1.20E-03	1.76E-03	1.33E-03	1.63E-03	1.07E-03	1.40E-03
SR-85M	67.66 M	8.23E-04	4.99E-04	4.96E-04	7.45E-04	5.67E-04	7.14E-04	4.44E-04	5.88E-04
SR-87M	2.805 H	1.24E-03	7.39E-04	7.42E-04	1.09E-03	8.22E-04	1.02E-03	6.61E-04	8.68E-04
SR-89	50.55 D	5.67E-07	3.37E-07	3.43E-07	4.90E-07	3.91E-07	4.68E-07	3.03E-07	3.94E-07
SR-90	28.6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SR-91	9.5 H	2.83E-03	1.68E-03	1.71E-03	2.45E-03	1.94E-03	2.33E-03	1.52E-03	1.97E-03
SR-92	2.71 H	5.43E-03	3.30E-03	3.33E-03	4.74E-03	3.78E-03	4.48E-03	3.04E-03	3.83E-03
SR-93	7.3 M	9.28E-03	5.60E-03	5.70E-03	8.11E-03	6.38E-03	7.61E-03	5.12E-03	6.54E-03

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
Y-86	14.74 H	9.45E-03	9.32E-03	1.05E-02	1.18E-02	9.22E-03	8.44E-03	9.81E-03	9.04E-03
Y-87	80.3 H	1.15E-03	1.09E-03	1.22E-03	1.47E-03	1.07E-03	9.60E-04	1.13E-03	1.05E-03
Y-88	106.60 D	7.25E-03	7.32E-03	8.21E-03	9.14E-03	7.28E-03	6.72E-03	7.74E-03	7.14E-03
Y-90	64.1 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Y-90M	3.19 H	1.61E-03	1.50E-03	1.65E-03	2.13E-03	1.47E-03	1.32E-03	1.56E-03	1.45E-03
Y-91	58.51 D	9.31E-06	9.23E-06	1.04E-05	1.15E-05	9.13E-06	8.39E-06	9.72E-06	8.95E-06
Y-91M	49.71 M	1.35E-03	1.29E-03	1.44E-03	1.69E-03	1.26E-03	1.13E-03	1.34E-03	1.23E-03
Y-92	3.54 H	6.57E-04	6.43E-04	7.24E-04	8.10E-04	6.36E-04	5.80E-04	6.76E-04	6.23E-04
Y-93	10.1 H	2.38E-04	2.35E-04	2.62E-04	3.04E-04	2.33E-04	2.14E-04	2.47E-04	2.29E-04
ZR-86	16.5 H	6.95E-04	6.39E-04	6.90E-04	9.78E-04	6.22E-04	5.57E-04	6.59E-04	6.18E-04
ZR-88	83.4 D	9.68E-04	9.04E-04	9.97E-04	1.26E-03	8.82E-04	7.93E-04	9.35E-04	8.70E-04
ZR-89	78.43 H	3.02E-03	2.92E-03	3.28E-03	3.72E-03	2.88E-03	2.61E-03	3.06E-03	2.82E-03
ZR-93	1.53E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZR-95	64.02 D	1.91E-03	1.84E-03	2.06E-03	2.34E-03	1.81E-03	1.63E-03	1.92E-03	1.77E-03
ZR-97	16.90 H	4.68E-04	4.59E-04	5.14E-04	5.86E-04	4.53E-04	4.13E-04	4.81E-04	4.44E-04
NB-90	14.60 H	1.14E-02	1.15E-02	1.29E-02	1.46E-02	1.15E-02	1.06E-02	1.22E-02	1.13E-02
NB-91	1E4 Y	4.62E-06	4.04E-06	4.56E-06	1.49E-05	4.03E-06	3.56E-06	4.19E-06	4.09E-06
NB-91M	61 D	1.11E-04	1.09E-04	1.23E-04	1.45E-04	1.08E-04	9.91E-05	1.15E-04	1.06E-04
NB-92	3.6E7 Y	3.89E-03	3.76E-03	4.22E-03	4.80E-03	3.70E-03	3.35E-03	3.94E-03	3.62E-03
NB-92M	10.15 D	2.53E-03	2.46E-03	2.77E-03	3.10E-03	2.44E-03	2.21E-03	2.59E-03	2.38E-03
NB-93M	14.6 Y	8.63E-08	5.27E-09	1.68E-08	1.93E-06	2.21E-08	7.42E-09	6.99E-09	5.43E-08
NB-94	2.03E4 Y	4.11E-03	3.97E-03	4.46E-03	5.03E-03	3.91E-03	3.54E-03	4.16E-03	3.82E-03
NB-94M	6.26 M	1.12E-05	1.06E-05	1.19E-05	2.07E-05	1.05E-05	9.46E-06	1.11E-05	1.04E-05
NB-95	35.06 D	1.99E-03	1.92E-03	2.16E-03	2.44E-03	1.89E-03	1.71E-03	2.01E-03	1.85E-03
NB-95M	86.6 H	1.52E-04	1.38E-04	1.49E-04	2.19E-04	1.35E-04	1.21E-04	1.43E-04	1.35E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
Y-86	14.74 H	9.81E-03	9.30E-03	9.88E-03	1.06E-02	1.00E-02	8.82E-03	8.05E-03	1.08E-02
Y-87	80.3 H	1.13E-03	1.09E-03	1.17E-03	1.35E-03	1.20E-03	1.04E-03	9.35E-04	1.38E-03
Y-88	106.60 D	7.76E-03	7.33E-03	7.74E-03	8.07E-03	7.83E-03	6.83E-03	6.36E-03	8.21E-03
Y-90	64.1 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Y-90M	3.19 H	1.55E-03	1.50E-03	1.61E-03	1.99E-03	1.64E-03	1.39E-03	1.29E-03	2.02E-03
Y-91	58.51 D	9.70E-06	9.19E-06	9.75E-06	1.03E-05	9.84E-06	8.79E-06	7.96E-06	1.05E-05
Y-91M	49.71 M	1.33E-03	1.28E-03	1.37E-03	1.56E-03	1.40E-03	1.23E-03	1.10E-03	1.58E-03
Y-92	3.54 H	6.75E-04	6.41E-04	6.81E-04	7.31E-04	6.90E-04	6.15E-04	5.54E-04	7.43E-04
Y-93	10.1 H	2.48E-04	2.35E-04	2.49E-04	2.72E-04	2.53E-04	2.18E-04	2.04E-04	2.77E-04
ZR-86	16.5 H	6.61E-04	6.35E-04	6.89E-04	8.98E-04	7.00E-04	5.74E-04	5.47E-04	9.16E-04
ZR-88	83.4 D	9.35E-04	9.00E-04	9.69E-04	1.17E-03	1.00E-03	8.45E-04	7.77E-04	1.19E-03
ZR-89	78.43 H	3.05E-03	2.90E-03	3.10E-03	3.38E-03	3.15E-03	2.81E-03	2.51E-03	3.43E-03
ZR-93	1.53E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZR-95	64.02 D	1.92E-03	1.83E-03	1.95E-03	2.14E-03	1.99E-03	1.78E-03	1.57E-03	2.18E-03
ZR-97	16.90 H	4.81E-04	4.57E-04	4.86E-04	5.30E-04	4.93E-04	4.34E-04	3.95E-04	5.39E-04
NB-90	14.60 H	1.23E-02	1.15E-02	1.22E-02	1.29E-02	1.23E-02	1.06E-02	1.00E-02	1.31E-02
NB-91	1E4 Y	4.26E-06	4.06E-06	4.69E-06	5.42E-06	4.53E-06	4.07E-06	3.68E-06	5.68E-06
NB-91M	61 D	1.15E-04	1.09E-04	1.16E-04	1.23E-04	1.16E-04	1.04E-04	9.42E-05	1.25E-04
NB-92	3.6E7 Y	3.93E-03	3.73E-03	3.99E-03	4.37E-03	4.05E-03	3.62E-03	3.22E-03	4.44E-03
NB-92M	10.15 D	2.59E-03	2.45E-03	2.61E-03	2.80E-03	2.64E-03	2.38E-03	2.12E-03	2.85E-03
NB-93M	14.6 Y	2.85E-08	1.63E-08	9.26E-08	1.15E-07	3.13E-08	5.48E-08	5.29E-08	1.52E-07
NB-94	2.03E4 Y	4.15E-03	3.94E-03	4.21E-03	4.59E-03	4.28E-03	3.83E-03	3.40E-03	4.67E-03
NB-94M	6.26 M	1.12E-05	1.05E-05	1.15E-05	1.25E-05	1.14E-05	1.04E-05	9.24E-06	1.29E-05
NB-95	35.06 D	2.01E-03	1.91E-03	2.04E-03	2.23E-03	2.07E-03	1.85E-03	1.64E-03	2.27E-03
NB-95M	86.6 H	1.43E-04	1.38E-04	1.50E-04	2.01E-04	1.52E-04	1.23E-04	1.19E-04	2.05E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
Y-86	14.74 H	1.49E-02	9.00E-03	9.14E-03	1.30E-02	1.03E-02	1.22E-02	8.22E-03	1.05E-02
Y-87	80.3 H	1.80E-03	1.06E-03	1.07E-03	1.57E-03	1.18E-03	1.45E-03	9.50E-04	1.25E-03
Y-88	106.60 D	1.15E-02	7.05E-03	7.17E-03	1.01E-02	8.00E-03	9.43E-03	6.55E-03	8.18E-03
Y-90	64.1 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Y-90M	3.19 H	2.46E-03	1.47E-03	1.48E-03	2.18E-03	1.65E-03	2.05E-03	1.31E-03	1.73E-03
Y-91	58.51 D	1.48E-05	8.89E-06	9.01E-06	1.28E-05	1.03E-05	1.22E-05	8.12E-06	1.04E-05
Y-91M	49.71 M	2.10E-03	1.25E-03	1.26E-03	1.83E-03	1.40E-03	1.71E-03	1.11E-03	1.46E-03
Y-92	3.54 H	1.04E-03	6.20E-04	6.30E-04	8.99E-04	7.15E-04	8.53E-04	5.63E-04	7.25E-04
Y-93	10.1 H	3.72E-04	2.27E-04	2.30E-04	3.28E-04	2.58E-04	3.07E-04	2.09E-04	2.64E-04
ZR-86	16.5 H	1.08E-03	6.29E-04	6.28E-04	9.44E-04	7.12E-04	8.93E-04	5.60E-04	7.47E-04
ZR-88	83.4 D	1.49E-03	8.84E-04	8.88E-04	1.31E-03	9.83E-04	1.21E-03	7.91E-04	1.04E-03
ZR-89	78.43 H	4.75E-03	2.82E-03	2.87E-03	4.11E-03	3.25E-03	3.90E-03	2.53E-03	3.30E-03
ZR-93	1.53E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZR-95	64.02 D	3.00E-03	1.77E-03	1.81E-03	2.59E-03	2.04E-03	2.46E-03	1.59E-03	2.08E-03
ZR-97	16.90 H	7.36E-04	4.43E-04	4.49E-04	6.43E-04	5.05E-04	6.05E-04	4.03E-04	5.17E-04
NB-90	14.60 H	1.80E-02	1.11E-02	1.13E-02	1.59E-02	1.25E-02	1.47E-02	1.03E-02	1.29E-02
NB-91	1E4 Y	2.19E-05	4.08E-06	4.14E-06	8.22E-06	4.39E-06	5.94E-06	3.50E-06	6.73E-06
NB-91M	61 D	1.88E-04	1.05E-04	1.07E-04	1.54E-04	1.22E-04	1.45E-04	9.59E-05	1.25E-04
NB-92	3.6E7 Y	6.12E-03	3.63E-03	3.69E-03	5.30E-03	4.17E-03	5.01E-03	3.25E-03	4.25E-03
NB-92M	10.15 D	4.00E-03	2.37E-03	2.42E-03	3.45E-03	2.76E-03	3.29E-03	2.14E-03	2.78E-03
NB-93M	14.6 Y	3.00E-06	4.19E-08	4.58E-08	5.48E-07	9.13E-09	1.49E-07	4.76E-10	4.56E-07
NB-94	2.03E4 Y	6.46E-03	3.82E-03	3.90E-03	5.59E-03	4.41E-03	5.30E-03	3.43E-03	4.49E-03
NB-94M	6.26 M	2.86E-05	1.03E-05	1.05E-05	1.69E-05	1.18E-05	1.47E-05	9.12E-06	1.37E-05
NB-95	35.06 D	3.13E-03	1.85E-03	1.89E-03	2.71E-03	2.13E-03	2.57E-03	1.66E-03	2.17E-03
NB-95M	86.6 H	2.37E-04	1.37E-04	1.36E-04	2.06E-04	1.55E-04	1.96E-04	1.22E-04	1.63E-04

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
NB-96	23.35 H	6.41E-03	6.21E-03	6.97E-03	7.91E-03	6.12E-03	5.55E-03	6.51E-03	5.99E-03
NB-97	72.1 M	1.71E-03	1.64E-03	1.84E-03	2.11E-03	1.61E-03	1.45E-03	1.71E-03	1.58E-03
NB-97M	60 S	1.89E-03	1.82E-03	2.04E-03	2.32E-03	1.79E-03	1.62E-03	1.91E-03	1.75E-03
MO-91	15.49 M	2.48E-03	2.36E-03	2.63E-03	3.12E-03	2.30E-03	2.07E-03	2.45E-03	2.26E-03
MO-93	3.5E3 Y	4.83E-07	2.95E-08	9.40E-08	1.08E-05	1.24E-07	4.16E-08	3.92E-08	3.04E-07
MO-99	66.02 H	4.00E-04	3.83E-04	4.27E-04	5.05E-04	3.77E-04	3.39E-04	4.01E-04	3.69E-04
MO-101	14.61 M	3.93E-03	3.88E-03	4.35E-03	4.94E-03	3.84E-03	3.52E-03	4.08E-03	3.77E-03
TC-95	20.0 H	2.05E-03	1.97E-03	2.22E-03	2.52E-03	1.94E-03	1.76E-03	2.07E-03	1.90E-03
TC-95M	61 D	1.72E-03	1.64E-03	1.82E-03	2.20E-03	1.61E-03	1.45E-03	1.71E-03	1.58E-03
TC-96	4.28 D	6.54E-03	6.31E-03	7.10E-03	8.00E-03	6.23E-03	5.64E-03	6.63E-03	6.09E-03
TC-96M	51.5 M	1.08E-04	1.04E-04	1.17E-04	1.40E-04	1.03E-04	9.37E-05	1.10E-04	1.01E-04
TC-97	2.6E6 Y	6.49E-07	7.55E-08	1.40E-07	1.29E-05	1.80E-07	7.62E-08	1.13E-07	4.22E-07
TC-97M	89 D	1.37E-06	8.46E-07	9.02E-07	1.23E-05	8.78E-07	6.95E-07	9.42E-07	1.08E-06
TC-98	4.2E6 Y	3.61E-03	3.46E-03	3.88E-03	4.44E-03	3.40E-03	3.07E-03	3.62E-03	3.33E-03
TC-99	2.13E5 Y	1.20E-09	1.19E-09	1.23E-09	2.28E-09	1.12E-09	9.80E-10	1.21E-09	1.08E-09
TC-99M	6.02 H	3.22E-04	2.97E-04	3.18E-04	5.12E-04	2.93E-04	2.55E-04	3.13E-04	2.87E-04
TC-101	14.2 M	8.76E-04	8.12E-04	8.88E-04	1.16E-03	7.93E-04	7.12E-04	8.39E-04	7.84E-04
RU-97	2.9 D	5.82E-04	5.32E-04	5.73E-04	8.32E-04	5.19E-04	4.64E-04	5.50E-04	5.16E-04
RU-103	39.35 D	1.22E-03	1.16E-03	1.29E-03	1.54E-03	1.13E-03	1.02E-03	1.20E-03	1.11E-03
RU-105	4.44 H	2.02E-03	1.93E-03	2.16E-03	2.52E-03	1.90E-03	1.71E-03	2.01E-03	1.86E-03
RU-106	368.2 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RH-103M	56.119 M	1.79E-07	1.03E-07	6.40E-08	2.29E-06	7.11E-08	5.74E-08	1.42E-07	1.30E-07
RH-105	35.36 H	1.98E-04	1.83E-04	1.99E-04	2.64E-04	1.78E-04	1.60E-04	1.89E-04	1.77E-04
RH-105M	45 S	6.83E-05	6.31E-05	6.72E-05	1.22E-04	6.20E-05	5.37E-05	6.68E-05	6.07E-05
RH-106	29.92 S	5.30E-04	5.07E-04	5.67E-04	6.61E-04	4.97E-04	4.49E-04	5.28E-04	4.87E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
NB-96	23.35 H	6.49E-03	6.18E-03	6.59E-03	7.20E-03	6.69E-03	5.96E-03	5.33E-03	7.32E-03
NB-97	72.1 M	1.71E-03	1.63E-03	1.74E-03	1.94E-03	1.78E-03	1.58E-03	1.40E-03	1.97E-03
NB-97M	60 S	1.90E-03	1.81E-03	1.93E-03	2.12E-03	1.97E-03	1.76E-03	1.56E-03	2.16E-03
MO-91	15.49 M	2.45E-03	2.34E-03	2.51E-03	2.89E-03	2.57E-03	2.25E-03	2.02E-03	2.93E-03
MO-93	3.5E3 Y	1.60E-07	9.13E-08	5.19E-07	6.47E-07	1.75E-07	3.07E-07	2.96E-07	8.52E-07
MO-99	66.02 H	3.99E-04	3.80E-04	4.08E-04	4.65E-04	4.12E-04	3.65E-04	3.27E-04	4.73E-04
MO-101	14.61 M	4.08E-03	3.88E-03	4.11E-03	4.44E-03	4.16E-03	3.66E-03	3.35E-03	4.51E-03
TC-95	20.0 H	2.06E-03	1.96E-03	2.10E-03	2.29E-03	2.13E-03	1.91E-03	1.69E-03	2.33E-03
TC-95M	61 D	1.71E-03	1.63E-03	1.75E-03	2.01E-03	1.77E-03	1.55E-03	1.40E-03	2.05E-03
TC-96	4.28 D	6.61E-03	6.28E-03	6.70E-03	7.28E-03	6.80E-03	6.10E-03	5.42E-03	7.40E-03
TC-96M	51.5 M	1.10E-04	1.04E-04	1.11E-04	1.20E-04	1.12E-04	1.00E-04	8.99E-05	1.22E-04
TC-97	2.6E6 Y	3.24E-07	1.55E-07	7.15E-07	9.30E-07	2.42E-07	4.34E-07	3.98E-07	1.18E-06
TC-97M	89 D	1.18E-06	9.03E-07	1.50E-06	2.28E-06	8.55E-07	1.05E-06	9.33E-07	2.53E-06
TC-98	4.2E6 Y	3.61E-03	3.44E-03	3.68E-03	4.07E-03	3.75E-03	3.34E-03	2.96E-03	4.13E-03
TC-99	2.13E5 Y	1.22E-09	1.19E-09	1.32E-09	2.23E-09	9.65E-10	1.00E-09	8.80E-10	2.30E-09
TC-99M	6.02 H	3.02E-04	2.97E-04	3.27E-04	4.99E-04	2.98E-04	2.57E-04	2.46E-04	5.13E-04
TC-101	14.2 M	8.39E-04	8.08E-04	8.72E-04	1.09E-03	8.97E-04	7.46E-04	6.98E-04	1.11E-03
RU-97	2.9 D	5.49E-04	5.30E-04	5.76E-04	7.72E-04	5.82E-04	4.73E-04	4.56E-04	7.89E-04
RU-103	39.35 D	1.20E-03	1.15E-03	1.24E-03	1.43E-03	1.27E-03	1.11E-03	9.93E-04	1.45E-03
RU-105	4.44 H	2.01E-03	1.92E-03	2.06E-03	2.32E-03	2.10E-03	1.85E-03	1.65E-03	2.36E-03
RU-106	368.2 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RH-103M	56.119 M	2.32E-07	9.32E-08	2.13E-07	3.17E-07	7.49E-08	1.40E-07	1.10E-07	3.58E-07
RH-105	35.36 H	1.89E-04	1.82E-04	1.97E-04	2.47E-04	2.03E-04	1.67E-04	1.57E-04	2.51E-04
RH-105M	45 S	6.46E-05	6.29E-05	7.01E-05	1.09E-04	6.16E-05	5.46E-05	5.18E-05	1.12E-04
RH-106	29.92 S	5.28E-04	5.04E-04	5.40E-04	6.07E-04	5.51E-04	4.86E-04	4.35E-04	6.17E-04

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
NB-96	23.35 H	1.01E-02	5.99E-03	6.09E-03	8.74E-03	6.89E-03	8.27E-03	5.40E-03	7.02E-03
NB-97	72.1 M	2.68E-03	1.58E-03	1.61E-03	2.32E-03	1.81E-03	2.18E-03	1.42E-03	1.86E-03
NB-97M	60 S	2.97E-03	1.76E-03	1.79E-03	2.57E-03	2.02E-03	2.43E-03	1.57E-03	2.06E-03
MO-91	15.49 M	3.86E-03	2.29E-03	2.31E-03	3.37E-03	2.55E-03	3.12E-03	2.05E-03	2.69E-03
MO-93	3.5E3 Y	1.68E-05	2.35E-07	2.57E-07	3.07E-06	5.12E-08	8.34E-07	2.66E-09	2.55E-06
MO-99	66.02 H	6.26E-04	3.71E-04	3.76E-04	5.45E-04	4.27E-04	5.17E-04	3.31E-04	4.36E-04
MO-101	14.61 M	6.20E-03	3.75E-03	3.80E-03	5.42E-03	4.27E-03	5.09E-03	3.43E-03	4.37E-03
TC-95	20.0 H	3.23E-03	1.90E-03	1.94E-03	2.78E-03	2.19E-03	2.64E-03	1.71E-03	2.24E-03
TC-95M	61 D	2.69E-03	1.59E-03	1.61E-03	2.34E-03	1.82E-03	2.22E-03	1.42E-03	1.87E-03
TC-96	4.28 D	1.03E-02	6.09E-03	6.21E-03	8.88E-03	7.04E-03	8.44E-03	5.46E-03	7.14E-03
TC-96M	51.5 M	1.80E-04	1.01E-04	1.03E-04	1.49E-04	1.16E-04	1.40E-04	9.08E-05	1.20E-04
TC-97	2.6E6 Y	1.93E-05	3.35E-07	3.72E-07	4.03E-06	1.05E-07	1.22E-06	7.13E-09	3.21E-06
TC-97M	89 D	1.72E-05	1.04E-06	1.08E-06	4.93E-06	1.04E-06	2.42E-06	6.20E-07	3.78E-06
TC-98	4.2E6 Y	5.65E-03	3.34E-03	3.40E-03	4.90E-03	3.83E-03	4.62E-03	2.99E-03	3.93E-03
TC-99	2.13E5 Y	2.06E-09	1.14E-09	1.15E-09	1.93E-09	1.50E-09	1.93E-09	9.95E-10	1.47E-09
TC-99M	6.02 H	4.90E-04	2.96E-04	2.94E-04	4.56E-04	3.52E-04	4.50E-04	2.61E-04	3.56E-04
TC-101	14.2 M	1.33E-03	7.97E-04	7.98E-04	1.18E-03	8.93E-04	1.11E-03	7.12E-04	9.36E-04
RU-97	2.9 D	8.92E-04	5.27E-04	5.24E-04	7.91E-04	5.98E-04	7.53E-04	4.69E-04	6.25E-04
RU-103	39.35 D	1.90E-03	1.13E-03	1.14E-03	1.66E-03	1.26E-03	1.54E-03	1.01E-03	1.33E-03
RU-105	4.44 H	3.15E-03	1.87E-03	1.90E-03	2.74E-03	2.13E-03	2.58E-03	1.67E-03	2.20E-03
RU-106	368.2 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RH-103M	56.119 M	3.12E-06	1.16E-07	1.31E-07	9.55E-07	1.11E-07	4.12E-07	2.55E-08	6.85E-07
RH-105	35.36 H	2.99E-04	1.80E-04	1.80E-04	2.66E-04	2.01E-04	2.50E-04	1.61E-04	2.11E-04
RH-105M	45 S	1.20E-04	6.29E-05	6.25E-05	1.02E-04	7.52E-05	9.81E-05	5.47E-05	7.90E-05
RH-106	29.92 S	8.27E-04	4.91E-04	4.98E-04	7.21E-04	5.55E-04	6.73E-04	4.41E-04	5.77E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
PD-103	16.961 D	1.69E-06	8.91E-07	6.95E-07	2.01E-05	7.41E-07	5.74E-07	1.32E-06	1.24E-06
PD-107	6.5E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PD-109	13.453 H	1.74E-06	1.65E-06	1.84E-06	2.20E-06	1.62E-06	1.45E-06	1.71E-06	1.58E-06
AG-106M	8.46 D	7.22E-03	7.01E-03	7.86E-03	9.00E-03	6.90E-03	6.28E-03	7.34E-03	6.77E-03
AG-108	2.37 M	4.46E-05	4.25E-05	4.75E-05	5.59E-05	4.16E-05	3.75E-05	4.42E-05	4.08E-05
AG-108M	127 Y	4.12E-03	3.93E-03	4.39E-03	5.15E-03	3.85E-03	3.47E-03	4.09E-03	3.77E-03
AG-109M	39.6 S	8.61E-06	8.36E-06	8.15E-06	2.69E-05	7.50E-06	6.55E-06	8.79E-06	7.57E-06
AG-110	24.57 S	7.86E-05	7.53E-05	8.44E-05	9.70E-05	7.40E-05	6.67E-05	7.86E-05	7.24E-05
AG-110M	249.85 D	7.10E-03	6.91E-03	7.77E-03	8.74E-03	6.81E-03	6.20E-03	7.25E-03	6.67E-03
AG-111	7.46 D	6.71E-05	6.22E-05	6.80E-05	8.90E-05	6.06E-05	5.44E-05	6.42E-05	6.00E-05
CD-109	464 D	2.06E-06	1.55E-06	7.17E-07	2.34E-05	8.16E-07	7.10E-07	2.26E-06	1.52E-06
CD-111M	48.7 M	7.12E-04	6.51E-04	7.00E-04	1.02E-03	6.35E-04	5.66E-04	6.74E-04	6.31E-04
CD-113	9.3E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-113M	13.7 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-115	53.46 H	5.16E-04	4.89E-04	5.45E-04	6.53E-04	4.78E-04	4.30E-04	5.08E-04	4.69E-04
CD-115M	44.6 D	5.72E-05	5.60E-05	6.30E-05	7.02E-05	5.53E-05	5.05E-05	5.89E-05	5.42E-05
CD-117	2.49 H	2.82E-03	2.78E-03	3.11E-03	3.56E-03	2.74E-03	2.52E-03	2.92E-03	2.70E-03
CD-117M	3.36 H	5.51E-03	5.54E-03	6.21E-03	6.95E-03	5.51E-03	5.09E-03	5.86E-03	5.40E-03
IN-111	2.83 D	9.92E-04	9.06E-04	9.72E-04	1.45E-03	8.85E-04	7.87E-04	9.40E-04	8.79E-04
IN-113M	1.658 H	6.45E-04	6.02E-04	6.63E-04	8.43E-04	5.87E-04	5.28E-04	6.23E-04	5.79E-04
IN-114	71.9 S	8.11E-05	7.76E-05	8.67E-05	1.01E-04	7.60E-05	6.86E-05	8.08E-05	7.45E-05
IN-114M	49.51 D	2.28E-04	2.15E-04	2.35E-04	3.14E-04	2.09E-04	1.88E-04	2.24E-04	2.06E-04
IN-115	4.6E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IN-115M	4.36 H	4.03E-04	3.73E-04	4.07E-04	5.44E-04	3.63E-04	3.26E-04	3.85E-04	3.60E-04
IN-116M	54.15 M	6.43E-03	6.40E-03	7.19E-03	8.02E-03	6.34E-03	5.83E-03	6.74E-03	6.21E-03

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
PD-103	16.961 D	1.97E-06	8.55E-07	1.93E-06	2.71E-06	8.52E-07	1.31E-06	1.09E-06	3.09E-06
PD-107	6.5E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PD-109	13.453 H	1.71E-06	1.64E-06	1.76E-06	2.03E-06	1.81E-06	1.58E-06	1.41E-06	2.07E-06
AG-106M	8.46 D	7.33E-03	6.98E-03	7.44E-03	8.16E-03	7.56E-03	6.69E-03	6.03E-03	8.29E-03
AG-108	2.37 M	4.42E-05	4.22E-05	4.53E-05	5.12E-05	4.62E-05	4.08E-05	3.64E-05	5.20E-05
AG-108M	127 Y	4.09E-03	3.90E-03	4.18E-03	4.73E-03	4.27E-03	3.77E-03	3.36E-03	4.80E-03
AG-109M	39.6 S	9.50E-06	8.11E-06	9.63E-06	1.61E-05	6.48E-06	7.19E-06	6.18E-06	1.68E-05
AG-110	24.57 S	7.85E-05	7.48E-05	8.01E-05	8.90E-05	8.16E-05	7.26E-05	6.45E-05	9.04E-05
AG-110M	249.85 D	7.23E-03	6.87E-03	7.32E-03	7.93E-03	7.43E-03	6.63E-03	5.94E-03	8.06E-03
AG-111	7.46 D	6.42E-05	6.19E-05	6.68E-05	8.33E-05	6.88E-05	5.71E-05	5.34E-05	8.48E-05
CD-109	464 D	3.43E-06	1.16E-06	2.50E-06	3.79E-06	8.64E-07	1.68E-06	1.26E-06	4.20E-06
CD-111M	48.7 M	6.71E-04	6.48E-04	7.05E-04	9.57E-04	7.08E-04	5.77E-04	5.56E-04	9.78E-04
CD-113	9.3E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-113M	13.7 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-115	53.46 H	5.08E-04	4.86E-04	5.22E-04	6.03E-04	5.34E-04	4.66E-04	4.19E-04	6.13E-04
CD-115M	44.6 D	5.87E-05	5.57E-05	5.92E-05	6.33E-05	6.00E-05	5.36E-05	4.82E-05	6.44E-05
CD-117	2.49 H	2.92E-03	2.77E-03	2.94E-03	3.20E-03	2.98E-03	2.61E-03	2.40E-03	3.25E-03
CD-117M	3.36 H	5.88E-03	5.55E-03	5.86E-03	6.14E-03	5.94E-03	5.17E-03	4.82E-03	6.25E-03
IN-111	2.83 D	9.33E-04	9.02E-04	9.84E-04	1.35E-03	9.79E-04	7.99E-04	7.72E-04	1.39E-03
IN-113M	1.658 H	6.24E-04	5.99E-04	6.45E-04	7.78E-04	6.65E-04	5.62E-04	5.17E-04	7.91E-04
IN-114	71.9 S	8.07E-05	7.71E-05	8.26E-05	9.29E-05	8.43E-05	7.44E-05	6.64E-05	9.44E-05
IN-114M	49.51 D	2.24E-04	2.13E-04	2.30E-04	2.60E-04	2.31E-04	2.00E-04	1.83E-04	2.86E-04
IN-115	4.6E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IN-115M	4.36 H	3.87E-04	3.71E-04	4.01E-04	4.98E-04	4.13E-04	3.43E-04	3.20E-04	5.07E-04
IN-116M	54.15 M	6.74E-03	6.39E-03	6.76E-03	7.15E-03	6.84E-03	6.04E-03	5.53E-03	7.27E-03

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
PD-103	16.961 D	2.75E-05	1.11E-06	1.23E-06	8.37E-06	8.98E-07	3.55E-06	3.05E-07	6.06E-06
PD-107	6.5E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PD-109	13.453 H	2.71E-06	1.61E-06	1.62E-06	2.37E-06	1.79E-06	2.19E-06	1.44E-06	1.89E-06
AG-106M	8.46 D	1.14E-02	6.77E-03	6.87E-03	9.87E-03	7.73E-03	9.29E-03	6.13E-03	7.93E-03
AG-108	2.37 M	7.01E-05	4.11E-05	4.17E-05	6.07E-05	4.65E-05	5.66E-05	3.68E-05	4.85E-05
AG-108M	127 Y	6.44E-03	3.80E-03	3.86E-03	5.60E-03	4.31E-03	5.24E-03	3.40E-03	4.47E-03
AG-109M	39.6 S	2.93E-05	7.90E-06	8.05E-06	1.80E-05	1.03E-05	1.49E-05	6.38E-06	1.33E-05
AG-110	24.57 S	1.23E-04	7.27E-05	7.40E-05	1.07E-04	8.29E-05	1.00E-04	6.51E-05	8.55E-05
AG-110M	249.85 D	1.12E-02	6.66E-03	6.77E-03	9.69E-03	7.66E-03	9.18E-03	6.02E-03	7.80E-03
AG-111	7.46 D	1.02E-04	6.11E-05	6.11E-05	9.04E-05	6.82E-05	8.47E-05	5.45E-05	7.17E-05
CD-109	464 D	3.06E-05	1.37E-06	1.57E-06	1.09E-05	1.43E-06	5.09E-06	2.27E-07	7.52E-06
CD-111M	48.7 M	1.08E-03	6.45E-04	6.41E-04	9.70E-04	7.33E-04	9.25E-04	5.73E-04	7.64E-04
CD-113	9.3E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-113M	13.7 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-115	53.46 H	8.03E-04	4.75E-04	4.80E-04	7.02E-04	5.32E-04	6.51E-04	4.25E-04	5.59E-04
CD-115M	44.6 D	9.02E-05	5.39E-05	5.48E-05	7.82E-05	6.24E-05	7.44E-05	4.88E-05	6.30E-05
CD-117	2.49 H	4.44E-03	2.69E-03	2.72E-03	3.88E-03	3.07E-03	3.67E-03	2.46E-03	3.13E-03
CD-117M	3.36 H	8.72E-03	5.34E-03	5.44E-03	7.65E-03	6.06E-03	7.15E-03	4.95E-03	6.20E-03
IN-111	2.83 D	1.52E-03	8.99E-04	8.93E-04	1.36E-03	1.03E-03	1.30E-03	7.97E-04	1.07E-03
IN-113M	1.658 H	9.96E-04	5.89E-04	5.91E-04	8.74E-04	6.55E-04	8.10E-04	5.26E-04	6.94E-04
IN-114	71.9 S	1.27E-04	7.51E-05	7.61E-05	1.10E-04	8.48E-05	1.03E-04	6.73E-05	8.83E-05
IN-114M	49.51 D	3.60E-04	2.09E-04	2.11E-04	3.16E-04	2.39E-04	2.96E-04	1.86E-04	2.50E-04
IN-115	4.6E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IN-115M	4.36 H	6.25E-04	3.66E-04	3.66E-04	5.47E-04	4.08E-04	5.08E-04	3.26E-04	4.33E-04
IN-116M	54.15 M	1.02E-02	6.17E-03	6.25E-03	8.87E-03	7.07E-03	8.38E-03	5.66E-03	7.17E-03

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
IN-117	43.8 M	1.75E-03	1.66E-03	1.83E-03	2.30E-03	1.62E-03	1.45E-03	1.72E-03	1.59E-03
IN-117M	116.5 M	2.24E-04	2.06E-04	2.23E-04	3.18E-04	2.01E-04	1.79E-04	2.14E-04	1.99E-04
SN-113	115.1 D	1.61E-05	1.52E-05	1.39E-05	5.00E-05	1.28E-05	1.17E-05	1.64E-05	1.39E-05
SN-117M	13.60 D	3.67E-04	3.37E-04	3.58E-04	5.88E-04	3.29E-04	2.89E-04	3.53E-04	3.25E-04
SN-119M	293.0 D	2.29E-06	2.48E-06	9.95E-07	2.05E-05	1.07E-06	1.08E-06	2.92E-06	1.76E-06
SN-123	129.2 D	1.80E-05	1.77E-05	2.00E-05	2.21E-05	1.75E-05	1.60E-05	1.86E-05	1.71E-05
SN-125	9.64 D	8.03E-04	7.91E-04	8.89E-04	9.93E-04	7.83E-04	7.17E-04	8.34E-04	7.57E-04
SN-126	1.0E5 Y	1.06E-04	1.08E-04	1.09E-04	2.24E-04	9.86E-05	8.67E-05	1.08E-04	9.50E-05
SB-117	2.80 H	4.28E-04	3.96E-04	4.23E-04	6.68E-04	3.86E-04	3.41E-04	4.15E-04	3.81E-04
SB-122	2.70 D	1.13E-03	1.08E-03	1.21E-03	1.41E-03	1.06E-03	9.53E-04	1.12E-03	1.04E-03
SB-124	60.20 D	4.90E-03	4.87E-03	5.46E-03	6.15E-03	4.81E-03	4.42E-03	5.12E-03	4.72E-03
SB-125	2.77 Y	1.07E-03	1.01E-03	1.12E-03	1.38E-03	9.90E-04	8.91E-04	1.05E-03	9.72E-04
SB-126	12.4 D	7.10E-03	6.80E-03	7.61E-03	8.79E-03	6.68E-03	6.03E-03	7.10E-03	6.54E-03
SB-126M	19.0 M	4.04E-03	3.85E-03	4.31E-03	5.02E-03	3.78E-03	3.41E-03	4.02E-03	3.71E-03
SB-127	3.85 D	1.70E-03	1.62E-03	1.81E-03	2.12E-03	1.59E-03	1.43E-03	1.69E-03	1.56E-03
SB-129	4.40 H	3.75E-03	3.65E-03	4.10E-03	4.63E-03	3.61E-03	3.28E-03	3.84E-03	3.53E-03
TE-121	16.8 D	1.42E-03	1.36E-03	1.51E-03	1.81E-03	1.32E-03	1.19E-03	1.41E-03	1.30E-03
TE-121M	154 D	5.24E-04	4.85E-04	5.19E-04	7.59E-04	4.70E-04	4.22E-04	5.01E-04	4.68E-04
TE-123	1E13 Y	3.37E-06	4.14E-06	1.63E-06	2.63E-05	1.70E-06	1.83E-06	4.26E-06	2.65E-06
TE-123M	119.7 D	3.50E-04	3.22E-04	3.42E-04	5.59E-04	3.14E-04	2.76E-04	3.37E-04	3.10E-04
TE-125M	58 D	1.18E-05	1.53E-05	6.78E-06	7.73E-05	6.80E-06	7.38E-06	1.42E-05	9.56E-06
TE-127	9.35 H	1.22E-05	1.15E-05	1.26E-05	1.59E-05	1.12E-05	1.00E-05	1.19E-05	1.10E-05
TE-127M	109 D	3.94E-06	4.95E-06	2.43E-06	2.45E-05	2.39E-06	2.51E-06	4.68E-06	3.22E-06
TE-129	69.6 M	1.36E-04	1.29E-04	1.43E-04	1.80E-04	1.26E-04	1.13E-04	1.34E-04	1.24E-04
TE-129M	33.6 D	6.36E-05	6.12E-05	6.89E-05	1.17E-04	7.81E-05	7.07E-05	6.46E-05	7.71E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
IN-117	43.8 M	1.71E-03	1.65E-03	1.78E-03	2.14E-03	1.79E-03	1.56E-03	1.41E-03	2.18E-03
IN-117M	116.5 M	2.13E-04	2.05E-04	2.23E-04	2.95E-04	2.24E-04	1.85E-04	1.76E-04	3.01E-04
SN-113	115.1 D	1.89E-05	1.40E-05	1.68E-05	2.33E-05	1.43E-05	1.33E-05	1.21E-05	2.41E-05
SN-117M	13.60 D	3.47E-04	3.35E-04	3.69E-04	5.46E-04	3.46E-04	2.92E-04	2.81E-04	5.60E-04
SN-119M	293.0 D	4.67E-06	1.69E-06	2.88E-06	4.57E-06	1.02E-06	1.99E-06	1.41E-06	4.90E-06
SN-123	129.2 D	1.86E-05	1.76E-05	1.87E-05	1.99E-05	1.89E-05	1.70E-05	1.52E-05	2.02E-05
SN-125	9.64 D	8.33E-04	7.89E-04	8.38E-04	8.92E-04	8.48E-04	7.53E-04	6.83E-04	9.07E-04
SN-126	1.0E5 Y	1.13E-04	1.07E-04	1.19E-04	2.03E-04	8.25E-05	8.96E-05	7.69E-05	2.09E-04
SB-117	2.80 H	4.09E-04	3.93E-04	4.31E-04	6.13E-04	4.10E-04	3.49E-04	3.31E-04	6.28E-04
SB-122	2.70 D	1.12E-03	1.07E-03	1.15E-03	1.30E-03	1.17E-03	1.04E-03	9.24E-04	1.32E-03
SB-124	60.20 D	5.12E-03	4.86E-03	5.15E-03	5.50E-03	5.22E-03	4.58E-03	4.21E-03	5.59E-03
SB-125	2.77 Y	1.06E-03	1.01E-03	1.08E-03	1.26E-03	1.10E-03	9.63E-04	8.66E-04	1.28E-03
SB-126	12.4 D	7.08E-03	6.75E-03	7.23E-03	8.07E-03	7.37E-03	6.53E-03	5.82E-03	8.20E-03
SB-126M	19.0 M	4.01E-03	3.83E-03	4.10E-03	4.62E-03	4.19E-03	3.70E-03	3.30E-03	4.70E-03
SB-127	3.85 D	1.69E-03	1.61E-03	1.73E-03	1.95E-03	1.76E-03	1.55E-03	1.39E-03	1.98E-03
SB-129	4.40 H	3.83E-03	3.64E-03	3.87E-03	4.19E-03	3.93E-03	3.49E-03	3.14E-03	4.26E-03
TE-121	16.8 D	1.41E-03	1.35E-03	1.45E-03	1.65E-03	1.47E-03	1.30E-03	1.16E-03	1.67E-03
TE-121M	154 D	5.04E-04	4.81E-04	5.23E-04	6.93E-04	5.22E-04	4.30E-04	4.12E-04	7.08E-04
TE-123	1E13 Y	7.38E-06	2.84E-06	4.31E-06	7.01E-06	1.54E-06	3.03E-06	2.07E-06	7.41E-06
TE-123M	119.7 D	3.32E-04	3.20E-04	3.52E-04	5.22E-04	3.30E-04	2.79E-04	2.68E-04	5.35E-04
TE-125M	58 D	2.53E-05	1.11E-05	1.51E-05	2.51E-05	5.89E-06	1.08E-05	7.40E-06	2.62E-05
TE-127	9.35 H	1.18E-05	1.14E-05	1.23E-05	1.48E-05	1.26E-05	1.07E-05	9.83E-06	1.51E-05
TE-127M	109 D	8.00E-06	3.67E-06	4.99E-06	8.20E-06	2.07E-06	3.60E-06	2.51E-06	8.56E-06
TE-129	69.6 M	1.35E-04	1.28E-04	1.38E-04	1.60E-04	1.40E-04	1.22E-04	1.10E-04	1.63E-04
TE-129M	33.6 D	8.68E-05	7.98E-05	8.61E-05	9.70E-05	8.56E-05	7.76E-05	6.83E-05	9.87E-05

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
IN-117	43.8 M	2.72E-03	1.61E-03	1.63E-03	2.40E-03	1.83E-03	2.25E-03	1.44E-03	1.91E-03
IN-117M	116.5 M	3.46E-04	2.03E-04	2.03E-04	3.07E-04	2.30F-04	2.90E-04	1.80E-04	2.42E-04
SN-113	115.1 D	5.94E-05	1.39E-05	1.43E-05	3.40E-05	1.63E-05	2.52E-05	1.09E-05	2.48E-05
SN-117M	13.60 D	5.83E-04	3.34E-04	3.32E-04	5.22E-04	3.92E-04	5.04E-04	2.94E-04	4.07E-04
SN-119M	293.0 D	2.53E-05	1.68E-06	1.92E-06	1.09E-05	2.39E-06	5.98E-06	5.03F-07	7.29E-06
SN-123	129.2 D	2.85E-05	1.70E-05	1.73E-05	2.47E-05	1.98E-05	2.36E-05	1.55E-05	1.99E-05
SN-125	9.64 D	1.27E-03	7.62E-04	7.76E-04	1.10E-03	8.78E-04	1.04E-03	6.95E-04	8.90E-04
SN-126	1.0E5 Y	2.08E-04	1.01E-04	1.02E-04	1.83E-04	1.37E-04	1.78E-04	8.71E-05	1.38E-04
SB-117	2.80 H	6.87E-04	3.91E-04	3.89E-04	6.07E-04	4.56E-04	5.82E-04	3.44E-04	4.75E-04
SB-122	2.70 D	1.77E-03	1.05E-03	1.06E-03	1.54E-03	1.18E-03	1.43E-03	9.36E-04	1.23E-03
SB-124	60.20 D	7.74E-03	4.69E-03	4.76E-03	6.77E-03	5.32E-03	6.33E-03	4.32E-03	5.47E-03
SB-125	2.77 Y	1.69E-03	9.84E-04	9.95E-04	1.46E-03	1.11E-03	1.36E-03	8.78E-04	1.16E-03
SB-126	12.4 D	1.11E-02	6.57E-03	6.68E-03	9.64E-03	7.50E-03	9.07E-03	5.88E-03	7.72E-03
SB-126M	19.0 M	6.30E-03	3.73E-03	3.79E-03	5.48E-03	4.24E-03	5.14E-03	3.34E-03	4.38E-03
SB-127	3.85 D	2.65E-03	1.57E-03	1.59E-03	2.31E-03	1.79E-03	2.17E-03	1.40E-03	1.85E-03
SB-129	4.40 H	5.89E-03	3.52E-03	3.58E-03	5.12E-03	4.05E-03	4.85E-03	3.19E-03	4.12E-03
TE-121	16.8 D	2.26E-03	1.31E-03	1.33E-03	1.95E-03	1.48E-03	1.81E-03	1.17E-03	1.55E-03
TE-121M	154 D	8.17E-04	4.76E-04	4.75E-04	7.23E-04	5.47E-04	6.88E-04	4.23E-04	5.69E-04
TE-123	1E13 Y	3.14E-05	2.60E-06	2.97E-06	1.51E-05	4.25E-06	9.03E-06	9.84E-07	9.96E-06
TE-123M	119.7 D	5.53E-04	3.20E-04	3.17E-04	4.98E-04	3.75E-04	4.82E-04	2.81E-04	3.88E-04
TE-125M	58 D	8.90E-05	9.64E-06	1.09E-05	4.74E-05	1.69E-05	3.09E-05	4.88E-06	3.12E-05
TE-127	9.35 H	1.87E-05	1.12E-05	1.12E-05	1.66E-05	1.25E-05	1.54E-05	1.00E-05	1.32E-05
TE-127M	109 D	2.83E-05	3.25E-06	3.63E-06	1.51E-05	5.46E-06	9.92E-06	1.72E-06	1.00E-05
TE-129	69.6 M	2.20E-04	1.25E-04	1.26E-04	1.88E-04	1.41E-04	1.74E-04	1.12E-04	1.49E-04
TE-129M	33.6 D	1.47E-04	7.73E-05	7.89E-05	1.21E-04	8.97E-05	1.11E-04	6.83E-05	9.53E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
TE-131	25.0 M	1.08E-03	1.02E-03	1.13E-03	1.43E-03	1.01E-03	9.05E-04	1.07E-03	9.88E-04
TE-131M	30 H	3.71E-03	3.61E-03	4.04E-03	4.64E-03	3.56E-03	3.23E-03	3.78E-03	3.48E-03
TE-132	78.2 H	5.39E-04	4.98E-04	5.26E-04	8.11E-04	4.76E-04	4.28E-04	5.11E-04	4.77E-04
TE-133	12.45 M	2.41E-03	2.33E-03	2.59E-03	3.05E-03	2.29E-03	2.09E-03	2.43E-03	2.25E-03
TE-133M	55.4 M	5.83E-03	5.67E-03	6.36E-03	7.25E-03	5.60E-03	5.09E-03	5.96E-03	5.49E-03
TE-134	41.8 M	2.22E-03	2.11E-03	2.34E-03	2.87E-03	2.07E-03	1.86E-03	2.20E-03	2.03E-03
I-122	3.62 M	2.46E-03	2.35E-03	2.62E-03	3.11E-03	2.30E-03	2.07E-03	2.44E-03	2.25E-03
I-123	13.13 H	3.90E-04	3.61E-04	3.82E-04	6.27E-04	3.50E-04	3.09E-04	3.77E-04	3.46E-04
I-124	4.18 D	2.72E-03	2.66E-03	2.97E-03	3.44E-03	2.62E-03	2.39E-03	2.79E-03	2.57E-03
I-125	60.14 D	1.31E-05	1.73E-05	7.08E-06	9.07E-05	7.19E-06	7.99E-06	1.60E-05	1.05E-05
I-126	12.93 D	1.17E-03	1.11E-03	1.24E-03	1.48E-03	1.09E-03	9.80E-04	1.16E-03	1.07E-03
I-128	24.99 M	1.90E-04	1.79E-04	1.98E-04	2.43E-04	1.75E-04	1.57E-04	1.86E-04	1.72E-04
I-129	1.57E7 Y	1.08E-05	1.50E-05	6.92E-06	6.13E-05	6.74E-06	7.61E-06	1.22E-05	8.94E-06
I-130	12.36 H	5.50E-03	5.27E-03	5.90E-03	6.82E-03	5.17E-03	4.67E-03	5.50E-03	5.07E-03
I-131	8.040 D	9.66E-04	9.03E-04	9.94E-04	1.26E-03	8.82E-04	7.92E-04	9.34E-04	8.70E-04
I-132	2.30 H	5.95E-03	5.75E-03	6.46E-03	7.34E-03	5.67E-03	5.14E-03	6.03E-03	5.55E-03
I-133	20.8 H	1.55E-03	1.48E-03	1.65E-03	1.94E-03	1.45E-03	1.31E-03	1.54E-03	1.42E-03
I-134	52.6 M	6.89E-03	6.71E-03	7.54E-03	8.49E-03	6.63E-03	6.03E-03	7.05E-03	6.49E-03
I-135	6.61 H	4.12E-03	4.11E-03	4.62E-03	5.14E-03	4.07E-03	3.75E-03	4.33E-03	3.99E-03
I-136	83 S	6.86E-03	6.95E-03	7.76E-03	8.71E-03	6.91E-03	6.43E-03	7.35E-03	6.80E-03
XE-122	20.1 H	1.44E-04	1.37E-04	1.42E-04	2.37E-04	1.27E-04	1.15E-04	1.40E-04	1.28E-04
XE-123	2.14 H	1.58E-03	1.53E-03	1.69E-03	2.10E-03	1.50E-03	1.36E-03	1.60E-03	1.47E-03
XE-125	16.8 H	6.19E-04	5.79E-04	6.17E-04	9.20E-04	5.57E-04	5.00E-04	5.97E-04	5.54E-04
XE-127	36.406 D	6.55E-04	6.05E-04	6.43E-04	9.78E-04	5.83E-04	5.21E-04	6.24E-04	5.81E-04
XE-129M	8.89 D	4.14E-05	4.61E-05	3.41E-05	1.38E-04	3.19E-05	3.10E-05	4.23E-05	3.56E-05

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
(IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
TE-131	25.0 M	1.06E-03	1.02E-03	1.10E-03	1.33E-03	1.09E-03	9.57E-04	8.73E-04	1.35E-03
TE-131M	30 H	3.78E-03	3.59E-03	3.83E-03	4.21E-03	3.87E-03	3.44E-03	3.10E-03	4.28E-03
TE-132	78.2 H	5.19E-04	4.93E-04	5.38E-04	7.36E-04	5.32E-04	4.37E-04	4.19E-04	7.52E-04
TE-133	12.45 M	2.43E-03	2.32E-03	2.47E-03	2.78E-03	2.52E-03	2.19E-03	2.01E-03	2.83E-03
TE-133M	55.4 M	5.95E-03	5.65E-03	6.02E-03	6.57E-03	6.09E-03	5.41E-03	4.88E-03	6.68E-03
TE-134	41.8 M	2.20E-03	2.10E-03	2.26E-03	2.65E-03	2.28E-03	2.00E-03	1.80E-03	2.70E-03
I-122	3.62 M	2.44E-03	2.34E-03	2.51E-03	2.86E-03	2.56E-03	2.24E-03	2.01E-03	2.91E-03
I-123	13.13 H	3.75E-04	3.58E-04	3.94E-04	5.70E-04	3.70E-04	3.15E-04	3.00E-04	5.85E-04
I-124	4.18 D	2.79E-03	2.65E-03	2.82E-03	3.10E-03	2.87E-03	2.52E-03	2.29E-03	3.15E-03
I-125	60.14 D	2.92E-05	1.22E-05	1.70E-05	2.82E-05	6.19E-06	1.21E-05	8.09E-06	2.95E-05
I-126	12.93 D	1.16E-03	1.10E-03	1.18E-03	1.34E-03	1.21E-03	1.06E-03	9.50E-04	1.37E-03
I-128	24.99 M	1.86E-04	1.78E-04	1.91E-04	2.24E-04	1.96E-04	1.69E-04	1.53E-04	2.27E-04
I-129	1.57E7 Y	2.34E-05	1.14E-05	1.42E-05	2.42E-05	5.40E-06	1.02E-05	6.75E-06	2.50E-05
I-130	12.36 H	5.49E-03	5.24E-03	5.60E-03	6.25E-03	5.71E-03	5.06E-03	4.51E-03	6.36E-03
I-131	8.040 D	9.35E-04	8.98E-04	9.68E-04	1.17E-03	9.95E-04	8.42E-04	7.75E-04	1.19E-03
I-132	2.30 H	6.02E-03	5.72E-03	6.11E-03	6.68E-03	6.21E-03	5.53E-03	4.94E-03	6.79E-03
I-133	20.8 H	1.54E-03	1.47E-03	1.58E-03	1.78E-03	1.61E-03	1.42E-03	1.27E-03	1.81E-03
I-134	52.6 M	7.03E-03	6.68E-03	7.11E-03	7.69E-03	7.21E-03	6.43E-03	5.77E-03	7.82E-03
I-135	6.61 H	4.33E-03	4.10E-03	4.34E-03	4.58E-03	4.39E-03	3.87E-03	3.56E-03	4.66E-03
I-136	83 S	7.42E-03	6.96E-03	7.32E-03	7.60E-03	7.45E-03	6.41E-03	6.08E-03	7.73E-03
XE-122	20.1 H	1.48E-04	1.33E-04	1.46E-04	1.91E-04	1.41E-04	1.23E-04	1.12E-04	1.95E-04
XE-123	2.14 H	1.60E-03	1.52E-03	1.63E-03	1.90E-03	1.63E-03	1.42E-03	1.31E-03	1.93E-03
XE-125	16.8 H	6.06E-04	5.72E-04	6.23E-04	8.23E-04	6.13E-04	5.17E-04	4.87E-04	8.41E-04
XE-127	36.406 D	6.30E-04	5.99E-04	6.53E-04	8.90E-04	6.45E-04	5.34E-04	5.10E-04	9.09E-04
XE-129M	8.89 D	6.09E-05	3.99E-05	4.67E-05	7.22E-05	3.21E-05	3.56E-05	2.94E-05	7.43E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
TE-131	25.0 M	1.67E-03	9.98E-04	1.01E-03	1.48E-03	1.15E-03	1.41E-03	8.94E-04	1.18E-03
TE-131M	30 H	5.84E-03	3.48E-03	3.54E-03	5.08E-03	4.01E-03	4.81E-03	3.14E-03	4.08E-03
TE-132	78.2 H	8.55E-04	4.88E-04	4.86E-04	7.55E-04	5.63E-04	7.15E-04	4.31E-04	5.91F-04
TE-133	12.45 M	3.75E-03	2.26E-03	2.28E-03	3.28E-03	2.56E-03	3.09E-03	2.05E-03	2.64E-03
TE-133M	55.4 M	9.16E-03	5.47E-03	5.57E-03	7.97E-03	6.30E-03	7.55E-03	4.95E-03	6.41E-03
TE-134	41.8 M	3.47E-03	2.05E-03	2.07E-03	3.04E-03	2.34E-03	2.87E-03	1.83E-03	2.42E-03
I-122	3.62 M	3.85E-03	2.28E-03	2.31E-03	3.36E-03	2.55E-03	3.11E-03	2.04E-03	2.68E-03
I-123	13.13 H	6.36E-04	3.56E-04	3.54E-04	5.61E-04	4.17E-04	5.37E-04	3.12E-04	4.37E-04
I-124	4.18 D	4.31E-03	2.57E-03	2.61E-03	3.75E-03	2.90E-03	3.49E-03	2.33E-03	3.01E-03
I-125	60.14 D	1.05E-04	1.06E-05	1.20E-05	5.51E-05	1.89E-05	3.53E-05	4.98E-06	3.61E-05
I-126	12.93 D	1.84E-03	1.08E-03	1.09E-03	1.59E-03	1.22E-03	1.49E-03	9.61E-04	1.27E-03
I-128	24.99 M	2.95E-04	1.74E-04	1.76E-04	2.58E-04	1.95E-04	2.39E-04	1.56E-04	2.05E-04
I-129	1.57E7 Y	6.77E-05	9.27E-06	1.04E-05	4.04E-05	1.80E-05	2.87E-05	5.63E-06	2.64E-05
I-130	12.36 H	8.59E-03	5.09E-03	5.17E-03	7.47E-03	5.80E-03	7.02E-03	4.56E-03	5.98E-03
I-131	8.040 D	1.48E-03	8.83E-04	8.87E-04	1.31E-03	9.88E-04	1.22E-03	7.89E-04	1.04E-03
I-132	2.30 H	9.34E-03	5.55E-03	5.65E-03	8.10E-03	6.36E-03	7.65E-03	5.00E-03	6.51E-03
I-133	20.8 H	2.42E-03	1.43E-03	1.45E-03	2.11E-03	1.62E-03	1.96E-03	1.29E-03	1.68E-03
I-134	52.6 M	1.08E-02	6.47E-03	6.59E-03	9.40E-03	7.45E-03	8.91E-03	5.85E-03	7.57E-03
I-135	6.61 H	6.53E-03	3.96E-03	4.01E-03	5.69E-03	4.53E-03	5.37E-03	3.64E-03	4.60E-03
I-136	83 S	1.08E-02	6.70E-03	6.84E-03	9.57E-03	7.60E-03	8.88E-03	6.22E-03	7.74E-03
XE-122	20.1 H	2.66E-04	1.30E-04	1.31E-04	2.17E-04	1.52E-04	1.95E-04	1.14E-04	1.67E-04
XE-123	2.14 H	2.51E-03	1.48E-03	1.50E-03	2.19E-03	1.69E-03	2.06E-03	1.34E-03	1.75E-03
XE-125	16.8 H	1.00E-03	5.64E-04	5.65E-04	8.73E-04	6.52E-04	8.23E-04	4.99E-04	6.85E-04
XE-127	36.406 D	1.04E-03	5.94E-04	5.91E-04	9.15E-04	6.82E-04	8.66E-04	5.25E-04	7.17E-04
XE-129M	8.89 D	1.50E-04	3.65E-05	3.83E-05	9.97E-05	5.37E-05	7.84E-05	2.79E-05	6.95E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
XE-131M	11.84 D	1.48E-05	1.65E-05	1.20E-05	5.26E-05	1.13E-05	1.09E-05	1.53E-05	1.27E-05
XE-133	5.245 D	7.25E-05	7.73E-05	7.33E-05	1.71E-04	6.65E-05	5.96E-05	7.42E-05	6.49E-05
XE-133M	2.19 D	6.82E-05	6.53E-05	6.42E-05	1.28E-04	5.86E-05	5.34E-05	6.54E-05	5.99E-05
XE-135	9.11 H	6.30E-04	5.79E-04	6.25E-04	8.68E-04	5.64E-04	5.06E-04	5.91E-04	5.60E-04
XE-135M	15.36 M	1.08E-03	1.03E-03	1.15E-03	1.37E-03	1.01E-03	9.06E-04	1.07E-03	9.86E-04
XE-137	3.83 M	4.79E-04	4.60E-04	5.12E-04	6.08E-04	4.51E-04	4.09E-04	4.78E-04	4.43E-04
XE-138	14.13 M	3.05E-03	3.07E-03	3.43E-03	3.93E-03	3.05E-03	2.82E-03	3.24E-03	3.00E-03
CS-126	1.64 M	2.86E-03	2.72E-03	3.03E-03	3.62E-03	2.66E-03	2.40E-03	2.82E-03	2.61E-03
CS-129	32.06 H	6.48E-04	6.12E-04	6.62E-04	9.01E-04	5.87E-04	5.29E-04	6.29E-04	5.82E-04
CS-131	9.688 D	8.87E-06	1.21E-05	5.23E-06	5.45E-05	5.20E-06	5.91E-06	1.00E-05	7.24E-06
CS-132	6.475 D	1.79E-03	1.72E-03	1.92E-03	2.25E-03	1.68E-03	1.52E-03	1.80E-03	1.65E-03
CS-134	2.062 Y	4.02E-03	3.86E-03	4.33E-03	4.96E-03	3.80E-03	3.43E-03	4.04E-03	3.72E-03
CS-134M	2.90 H	4.63E-05	4.52E-05	4.44E-05	9.41E-05	4.11E-05	3.63E-05	4.61E-05	4.10E-05
CS-135	2.3E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-136	13.16 D	5.64E-03	5.47E-03	6.13E-03	7.03E-03	5.40E-03	4.90E-03	5.74E-03	5.29E-03
CS-137	30.17 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-138	32.2 M	6.25E-03	6.27E-03	7.03E-03	7.88E-03	6.22E-03	5.75E-03	6.62E-03	6.11E-03
CS-139	9.40 M	8.15E-04	8.24E-04	9.24E-04	1.03E-03	8.19E-04	7.60E-04	8.72E-04	8.05E-04
BA-131	11.8 D	1.14E-03	1.08E-03	1.17E-03	1.56E-03	1.04E-03	9.36E-04	1.11E-03	1.03E-03
BA-133	10.5 Y	9.05E-04	8.55E-04	9.15E-04	1.31E-03	8.17E-04	7.35E-04	8.73E-04	8.09E-04
BA-133M	38.9 H	1.36E-04	1.29E-04	1.32E-04	2.19E-04	1.19E-04	1.08E-04	1.30E-04	1.20E-04
BA-135M	28.7 H	1.19E-04	1.13E-04	1.15E-04	1.97E-04	1.04E-04	9.44E-05	1.14E-04	1.05E-04
BA-137M	2.552 M	1.53E-03	1.47E-03	1.65E-03	1.90E-03	1.44E-03	1.30E-03	1.53E-03	1.41E-03
BA-139	83.1 M	8.86E-05	8.26E-05	8.87E-05	1.33E-04	8.08E-05	7.18E-05	8.62E-05	7.97E-05
BA-140	12.789 D	4.73E-04	4.48E-04	4.95E-04	6.15E-04	4.37E-04	3.92E-04	4.64E-04	4.29E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
XE-131M	11.84 D	2.23E-05	1.42E-05	1.68E-05	2.66E-05	1.11E-05	1.27E-05	1.04E-05	2.74E-05
XE-133	5.245 D	8.44E-05	7.46E-05	8.34E-05	1.44E-04	5.43E-05	6.25E-05	5.20E-05	1.48E-04
XE-133M	2.19 D	7.28E-05	6.27E-05	6.94E-05	9.62E-05	6.49E-05	5.60E-05	5.22E-05	9.85E-05
XE-135	9.11 H	5.97E-04	5.76E-04	6.24E-04	8.14E-04	6.37E-04	5.19E-04	4.96E-04	8.31E-04
XE-135M	15.36 M	1.07E-03	1.02E-03	1.10E-03	1.26E-03	1.12E-03	9.85E-04	8.81E-04	1.28E-03
XE-137	3.83 M	4.79E-04	4.58E-04	4.90E-04	5.57E-04	5.01E-04	4.33E-04	3.95E-04	5.66E-04
XE-138	14.13 M	3.26E-03	3.08E-03	3.26E-03	3.46E-03	3.30E-03	2.82E-03	2.67E-03	3.54E-03
CS-126	1.64 M	2.83E-03	2.71E-03	2.90E-03	3.34E-03	2.97E-03	2.59E-03	2.33E-03	3.39E-03
CS-129	32.06 H	6.43E-04	6.04E-04	6.53E-04	7.95E-04	6.61E-04	5.67E-04	5.18E-04	8.09E-04
CS-131	9.688 D	1.98E-05	8.99E-06	1.16E-05	1.96E-05	4.30E-06	8.36E-06	5.49E-06	2.03E-05
CS-132	6.475 D	1.80E-03	1.71E-03	1.83E-03	2.04E-03	1.86E-03	1.66E-03	1.47E-03	2.07E-03
CS-134	2.062 Y	4.03E-03	3.84E-03	4.11E-03	4.54E-03	4.18E-03	3.72E-03	3.31E-03	4.61E-03
CS-134M	2.90 H	4.93E-05	4.36E-05	4.88E-05	7.72E-05	4.01E-05	3.78E-05	3.45E-05	7.94E-05
CS-135	2.3E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-136	13.16 D	5.73E-03	5.44E-03	5.81E-03	6.39E-03	5.87E-03	5.23E-03	4.69E-03	6.50E-03
CS-137	30.17 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-138	32.2 M	6.64E-03	6.27E-03	6.62E-03	6.98E-03	6.71E-03	5.85E-03	5.45E-03	7.09E-03
CS-139	9.40 M	8.75E-04	8.26E-04	8.70E-04	9.06E-04	8.81E-04	7.66E-04	7.18E-04	9.21E-04
BA-131	11.8 D	1.12E-03	1.07E-03	1.15E-03	1.42E-03	1.15E-03	1.00E-03	9.[illegible]9E-04	1.44E-03
BA-133	10.5 Y	8.95E-04	8.45E-04	9.16E-04	1.18E-03	9.05E-04	7.75E-04	7.14E-04	1.20E-03
BA-133M	38.9 H	1.39E-04	1.26E-04	1.37E-04	1.82E-04	1.34E-04	1.13E-04	1.06E-04	1.86E-04
BA-135M	28.7 H	1.23E-04	1.10E-04	1.20E-04	1.61E-04	1.16E-04	9.88E-05	9.19E-05	1.64E-04
BA-137M	2.552 M	1.53E-03	1.46E-03	1.56E-03	1.74E-03	1.59E-03	1.42E-03	1.26E-03	1.77E-03
[illegible] 139	83.1 M	8.51E-05	8.22E-05	8.96E-05	1.25E-04	8.60E-05	7.25E-05	6.95E-05	1.28E-04
BA-140	12.789 D	4.65E-04	4.45E-04	4.78E-04	5.65E-04	4.86E-04	4.23E-04	3.82E-04	5.74E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
XE-131M	11.84 D	5.73E-05	1.30E-05	1.37E-05	3.72E-05	1.93E-05	2.88E-05	9.67E-06	2.58E-05
XE-133	5.245 D	1.62E-04	6.91E-05	7.07E-05	1.37E-04	9.83E-05	1.29E-04	5.90E-05	1.01E-04
XE-133M	2.19 D	1.38E-04	6.12E-05	6.16E-05	1.09E-04	7.37E-05	9.73E-05	[illegible]	8.27E-05
XE-135	9.11 H	9.47E-04	5.71E-04	5.69E-04	8.50E-04	6.45E-04	8.07E-04	5.09E-04	6.72E-04
XE-135M	15.3 M	1.69E-03	9.97E-04	1.01E-03	1.48E-03	1.12E-03	1.37E-03	8.93E-04	1.18E-03
XE-137	3.83 M	7.45E-04	4.46E-04	4.51E-04	[illegible]	5.00E-04	6.07E-04	4.03E-04	5.23E-04
XE-138	14.13 M	4.82E-03	2.97E-03	3.01E-03	4.25E-03	3.33E-03	3.95E-03	2.77E-03	3.44E-03
CS-126	1.64 M	4.45E-03	2.54E-03	2.67E-03	3.89E-03	2.96E-03	3.61E-03	2.37E-03	3.12E-03
CS-129	32.06 H	1.06E-03	5.91E-04	5.95E-04	9.09E-04	6.68E-04	8.34E-04	5.25E-04	7.15E-04
CS-131	9.688 D	5.11E-05	7.42E-06	7.41E-06	3.51E-05	1.42E-05	2.40E-05	4.05E-06	2.28E-05
CS-132	6.475 D	2.85E-03	1.66E-03	1.69E-03	2.46E-03	1.90E-03	2.30E-03	1.48E-03	1.96E-03
CS-134	2.062 Y	6.30E-03	3.73E-03	3.80E-03	5.47E-03	4.27E-03	5.15E-03	3.35E-03	4.38E-03
CS-134M	2.90 H	9.26E-05	4.25E-05	4.27E-05	7.72E-05	5.41E-05	7.18E-05	3.62E-05	5.80E-05
CS-135	2.3E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-136	13.16 D	8.87E-03	5.28E-03	5.37E-03	7.71E-03	6.11E-03	7.34E-03	4.76E-03	6.19E-03
CS-137	30.17 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-138	32.2 M	9.88E-03	6.05E-03	6.14E-03	8.67E-03	6.87E-03	8.11E-03	5.59E-03	7.02E-03
CS-139	9.40 M	1.29E-03	7.95E-04	8.08E-04	1.14E-03	9.02E-04	1.06E-03	7.38E-04	9.20E-04
BA-131	11.8 D	1.82E-03	1.04E-03	1.05E-03	1.58E-03	1.19E-03	1.48E-03	9.28E-04	1.25E-03
BA-133	10.5 Y	1.47E-03	8.27E-04	8.30E-04	1.28E-03	9.50E-04	1.19E-03	7.33E-04	1.00E-03
BA-133M	38.9 H	2.41E-04	1.23E-04	1.23E-04	2.02E-04	1.44E-04	1.84E-04	1.08E-04	1.56E-04
BA-135M	28.7 H	2.15E-04	1.07E-04	1.08E-04	1.79E-04	1.27E-04	1.63E-04	9.35E-05	1.38E-04
BA-137M	2.552 M	2.40E-03	1.42E-03	1.44E-03	2.08E-03	1.62E-03	1.96E-03	1.27E-03	1.67E-03
BA-139	83.1 M	1.36E-04	8.15E-05	8.11E-05	1.24E-04	9.51E-05	1.20E-04	7.25E-05	9.73E-05
BA-140	12.789 D	7.42E-04	4.35E-04	4.39E-04	6.48E-04	4.89E-04	6.02E-04	3.88E-04	5.45E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
BA-141	18.27 M	2.30E-03	2.21E-03	2.45E-03	2.97E-03	2.17E-03	1.97E-03	2.30E-03	2.13E-03
BA-142	10.70 M	2.33E-03	2.27E-03	2.54E-03	2.94E-03	2.24E-03	2.04E-03	2.38E-03	2.20E-03
LA-140	40.22 H	6.05E-03	6.04E-03	6.78E-03	7.62E-03	5.98E-03	5.52E-03	6.37E-03	5.87E-03
LA-141	3.94 H	1.10E-04	1.10E-04	1.24E-04	1.37E-04	1.09E-04	1.01E-04	1.16E-04	1.07E-04
LA-142	95.4 M	7.59E-03	7.72E-03	8.59E-03	9.71E-03	7.70E-03	7.16E-03	8.18E-03	7.57E-03
CE-139	137.66 D	3.59E-04	3.37E-04	3.48E-04	5.96E-04	3.20E-04	2.84E-04	3.46E-04	3.18E-04
CE-141	32.50 D	1.86E-04	1.74E-04	1.82E-04	3.04E-04	1.68E-04	1.47E-04	1.81E-04	1.65E-04
CE-143	33.0 H	6.51E-04	6.21E-04	6.68E-04	9.08E-04	5.93E-04	5.37E-04	6.36E-04	5.88E-04
CE-144	284.3 D	4.23E-05	4.08E-05	4.15E-05	7.59E-05	3.82E-05	3.36E-05	4.18E-05	3.76E-05
PR-142	19.13 H	1.52E-04	1.54E-04	1.73E-04	1.91E-04	1.52E-04	1.42E-04	1.62E-04	1.50E-04
PR-143	13.56 D	2.32E-11	2.23E-11	2.50E-11	2.84E-11	2.19E-11	1.98E-11	2.33E-11	2.14E-11
PR-144	17.28 M	8.71E-05	8.78E-05	9.82E-05	1.10E-04	8.73E-05	8.06E-05	9.28E-05	8.56E-05
PR-144M	7.2 M	7.72E-06	1.15E-05	5.89E-06	3.43E-05	5.52E-06	6.23E-06	8.82E-05	6.60E-06
ND-147	10.98 D	3.20E-04	3.13E-04	3.32E-04	4.82E-04	2.95E-04	2.66E-04	3.18E-04	2.90E-04
ND-149	1.73 H	9.50E-04	8.93E-04	9.68E-04	1.32E-03	8.65E-04	7.76E-04	9.22E-04	8.54E-04
PM-143	265 D	7.61E-04	7.43E-04	8.15E-04	9.97E-04	7.15E-04	6.50E-04	7.69E-04	7.03E-04
PM-144	363 D	3.94E-03	3.77E-03	4.21E-03	4.94E-03	3.69E-03	3.33E-03	3.93E-03	3.61E-03
PM-145	17.7 Y	2.62E-05	3.70E-05	2.19E-05	1.02E-04	2.02E-05	2.17E-05	2.92E-05	2.27E-05
PM-146	2020 D	1.90E-03	1.82E-03	2.02E-03	2.41E-03	1.78E-03	1.60E-03	1.89E-03	1.74E-03
PM-147	2.6234 Y	8.74E-09	8.17E-09	8.70E-09	1.46E-08	8.02E-09	6.94E-09	8.62E-09	7.80E-09
PM-148	5.37 D	1.48E-03	1.46E-03	1.64E-03	1.84E-03	1.44E-03	1.32E-03	1.53E-03	1.41E-03
PM-148M	41.3 D	5.12E-03	4.90E-03	5.48E-03	6.37E-03	4.81E-03	4.34E-03	5.11E-03	4.71E-03
PM-149	53.08 H	2.96E-05	2.75E-05	3.01E-05	3.94E-05	2.68E-05	2.41E-05	2.84E-05	2.66E-05
PM-151	28.40 H	8.38E-04	7.91E-04	8.62E-04	1.14E-03	7.67E-04	6.89E-04	8.17E-04	7.56E-04
SM-147	1.069E11 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
BA-141	18.27 M	2.30E-03	2.20E-03	2.35E-03	2.72E-03	2.39E-03	2.06E-03	1.90E-03	2.77E-03
BA-142	10.70 M	2.38E-03	2.26E-03	2.41E-03	2.66E-03	2.43E-03	2.16E-03	1.95E-03	2.71E-03
LA-140	40.22 H	6.37E-03	6.04E-03	6.39E-03	6.79E-03	6.47E-03	5.66E-03	5.24E-03	6.90E-03
LA-141	3.94 H	1.16E-04	1.10E-04	1.16E-04	1.22E-04	1.17E-04	1.04E-04	9.54E-05	1.24E-04
LA-142	95.4 M	8.28E-03	7.75E-03	8.14E-03	8.45E-03	8.30E-03	7.05E-03	6.77E-03	8.59E-03
CE-139	137.66 D	3.54E-04	3.31E-04	3.64E-04	5.37E-04	3.37E-04	2.88E-04	2.75E-04	5.51E-04
CE-141	32.50 D	1.79E-04	1.72E-04	1.89E-04	2.88E-04	1.72E-04	1.49E-04	1.42E-04	2.95E-04
CE-143	33.0 H	6.52E-04	6.12E-04	6.60E-04	8.15E-04	6.57E-04	5.70E-04	5.20E-04	8.30E-04
CE-144	284.3 D	4.26E-05	4.00E-05	4.42E-05	6.96E-05	3.73E-05	3.43E-05	3.18E-05	7.15E-05
PR-142	19.13 H	1.62E-04	1.54E-04	1.62E-04	1.68E-04	1.63E-04	1.43E-04	1.33E-04	1.71E-04
PR-143	13.56 D	2.32E-11	2.21E-11	2.36E-11	2.59E-11	2.41E-11	2.15E-11	1.91E-11	2.64E-11
PR-144	17.28 M	9.33E-05	8.80E-05	9.28E-05	9.74E-05	9.42E-05	8.14E-05	7.64E-05	9.90E-05
PR-144M	7.2 M	1.58E-05	8.98E-06	1.02E-05	1.80E-05	4.13E-06	7.44E-06	4.92E-06	1.84E-05
ND-147	10.98 D	3.30E-04	3.08E-04	3.33E-04	4.33E-04	3.11E-04	2.85E-04	2.53E-04	4.41E-04
ND-149	1.73 H	9.27E-04	8.86E-04	9.58E-04	1.22E-03	9.53E-04	8.16E-04	7.54E-04	1.24E-03
PM-143	265 D	7.85E-04	7.31E-04	7.83E-04	8.79E-04	7.79E-04	7.07E-04	6.23E-04	8.94E-04
PM-144	363 D	3.94E-03	3.74E-03	4.01E-03	4.51E-03	4.07E-03	3.62E-03	3.22E-03	4.58E-03
PM-145	17.7 Y	4.81E-05	3.03E-05	3.40E-05	6.02E-05	1.50E-05	2.48E-05	1.71E-05	6.15E-05
PM-146	2020 D	1.90E-03	1.81E-03	1.93E-03	2.19E-03	1.96E-03	1.74E-03	1.55E-03	2.23E-03
PM-147	2.6234 Y	8.29E-09	8.15E-09	9.02E-09	1.43E-08	7.80E-09	7.02E-09	6.61E-09	1.47E-08
PM-148	5.37 D	1.53E-03	1.45E-03	1.54E-03	1.65E-03	1.56E-03	1.38E-03	1.26E-03	1.68E-03
PM-148M	41.3 D	5.10E-03	4.87E-03	5.21E-03	5.85E-03	5.31E-03	4.70E-03	4.19E-03	5.95E-03
PM-149	53.08 H	2.85E-05	2.74E-05	2.95E-05	3.67E-05	3.03E-05	2.53E-05	2.36E-05	3.74E-05
PM-151	28.40 H	8.22E-04	7.84E-04	8.47E-04	1.05E-03	8.47E-04	7.29E-04	6.69E-04	1.07E-03
SM-147	1.069E11 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
BA-141	18.27 M	3.56E-03	2.14E-03	2.16E-03	3.14E-03	2.44E-03	2.96E-03	1.94E-03	2.51E-03
BA-142	10.70 M	3.68E-03	2.19E-03	2.22E-03	3.20E-03	2.54E-03	3.05E-03	1.98E-03	2.57E-03
LA-140	40.22 H	9.57E-03	5.83E-03	5.90E-03	8.38E-03	6.62E-03	7.85E-03	5.38E-03	6.78E-03
LA-141	3.94 H	1.74E-04	1.06E-04	1.07E-04	1.52E-04	1.22E-04	1.44E-04	9.80E-05	1.23E-04
LA-142	95.4 M	1.19E-02	7.45E-03	7.63E-03	1.06E-02	8.35E-03	9.75E-03	6.94E-03	8.60E-03
CE-139	137.66 D	5.94E-04	3.27E-04	3.26E-04	5.28E-04	3.92E-04	5.05E-04	2.87E-04	4.07E-04
CE-141	32.50 D	2.94E-04	1.71E-04	1.70E-04	2.69E-04	2.05E-04	2.63E-04	1.50E-04	2.09E-04
CE-143	33.0 H	1.05E-03	5.96E-04	6.02E-04	9.15E-04	6.91E-04	8.56E-04	5.31E-04	7.21E-04
CE-144	284.3 D	7.25E-05	3.91E-05	3.91E-05	6.53E-05	4.91E-05	6.33E-05	3.41E-05	4.99E-05
PR-142	19.13 H	2.41E-04	1.48E-04	1.50E-04	2.11E-04	1.68E-04	1.98E-04	1.38E-04	1.71E-04
PR-143	13.56 D	3.63E-11	2.15E-11	2.19E-11	3.14E-11	2.47E-11	2.97E-11	1.92E-11	2.52E-11
PR-144	17.28 M	1.38E-04	8.46E-05	8.63E-05	1.21E-04	9.53E-05	1.12E-04	7.86E-05	9.82E-05
PR-144M	7.2 M	3.57E-05	7.04E-06	7.81E-06	2.47E-05	1.44E-05	1.98E-05	5.33E-06	1.64E-05
ND-147	10.98 D	5.42E-04	2.96E-04	3.00E-04	4.73E-04	3.55E-04	4.42E-04	2.63E-04	3.68E-04
ND-149	1.73 H	1.48E-03	8.70E-04	8.73E-04	1.31E-03	9.98E-04	1.24E-03	7.74E-04	1.04E-03
PM-143	265 D	1.25E-03	7.06E-04	7.21E-04	1.07E-03	8.29E-04	1.00E-03	6.29E-04	8.50E-04
PM-144	363 D	6.21E-03	3.64E-03	3.70E-03	5.38E-03	4.15E-03	5.04E-03	3.25E-03	4.30E-03
PM-145	17.7 Y	1.03E-04	2.44E-05	2.66E-05	7.53E-05	4.70E-05	6.29E-05	1.94E-05	5.08E-05
PM-146	2020 D	3.00E-03	1.76E-03	1.78E-03	2.60E-03	2.00E-03	2.44E-03	1.57E-03	2.08E-03
PM-147	2.6234 Y	1.36E-08	8.11E-09	8.06E-09	1.27E-08	9.84E-09	1.27E-08	7.09E-09	9.90E-09
PM-148	5.37 D	2.33E-03	1.41E-03	1.42E-03	2.03E-03	1.61E-03	1.92E-03	1.29E-03	1.64E-03
PM-148M	41.3 D	8.00E-03	4.74E-03	4.81E-03	6.96E-03	5.39E-03	6.53E-03	4.24E-03	5.57E-03
PM-149	53.08 H	4.50E-05	2.70E-05	2.70E-05	4.00E-05	3.04E-05	3.77E-05	2.41E-05	3.17E-05
PM-151	28.40 H	1.31E-03	7.68E-04	7.73E-04	1.16E-03	8.81E-04	1.09E-03	6.85E-04	9.15E-04
SM-147	1.069E11 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
SM-151	90 Y	7.49E-10	4.02E-10	2.27E-10	1.10E-08	2.67E-10	2.03E-10	6.64E-10	5.32E-10
SM-153	46.7 H	1.09E-04	1.16E-04	1.07E-04	2.41E-04	9.76E-05	8.85E-05	1.11E-04	9.68E-05
EU-152	13.6 Y	2.93E-03	2.87E-03	3.20E-03	3.75E-03	2.82E-03	2.57E-03	3.01E-03	2.77E-03
EU-152M	9.32 H	8.08E-04	7.88E-04	8.78E-04	1.03E-03	7.72E-04	7.02E-04	8.25E-04	7.57E-04
EU-154	8.8 Y	3.23E-03	3.17E-03	3.55E-03	4.07E-03	3.12E-03	2.85E-03	3.33E-03	3.06E-03
EU-155	4.96 Y	1.27E-04	1.29E-04	1.28E-04	2.54E-04	1.17E-04	1.04E-04	1.29E-04	1.14E-04
EU-156	15.19 D	3.60E-03	3.61E-03	4.05E-03	4.54E-03	3.58E-03	3.30E-03	3.81E-03	3.51E-03
GD-152	1.1E14 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GD-153	241.6 D	1.84E-04	2.01E-04	1.80E-04	4.29E-04	1.65E-04	1.51E-04	1.90E-04	1.64E-04
GD-159	18.56 H	9.13E-05	8.84E-05	9.26E-05	1.37E-04	8.23E-05	7.48E-05	8.87E-05	8.17E-05
GD-162	9.7 M	1.06E-03	1.00E-03	1.11E-03	1.37E-03	9.76E-04	8.77E-04	1.03E-03	9.60E-04
TB-157	150 Y	4.27E-06	5.84E-06	3.88E-06	1.50E-05	3.50E-06	3.65E-06	4.65E-06	3.76E-06
TB-160	72.3 D	2.81E-03	2.73E-03	3.06E-03	3.51E-03	2.69E-03	2.45E-03	2.87E-03	2.64E-03
TB-162	7.76 M	2.85E-03	2.73E-03	3.04E-03	3.61E-03	2.68E-03	2.43E-03	2.85E-03	2.63E-03
DY-157	8.06 H	8.40E-04	7.94E-04	8.45E-04	1.20E-03	7.55E-04	6.82E-04	8.07E-04	7.50E-04
DY-165	2.334 H	5.92E-05	5.82E-05	6.18E-05	8.93E-05	5.48E-05	4.95E-05	5.90E-05	5.38E-05
DY-166	81.6 H	6.47E-05	7.24E-05	6.54E-05	1.53E-04	5.86E-05	5.45E-05	6.61E-05	5.79E-05
HO-166	26.80 H	6.57E-05	6.79E-05	7.26E-05	1.02E-04	6.42E-05	5.92E-05	6.90E-05	6.29E-05
HO-166M	1.20E3 Y	4.11E-03	3.93E-03	4.37E-03	5.24E-03	3.86E-03	3.48E-03	4.10E-03	3.78E-03
ER-169	9.40 D	3.98E-09	3.71E-09	3.93E-09	1.17E-08	3.62E-09	3.12E-09	3.90E-09	3.53E-09
ER-171	7.52 H	9.22E-04	8.63E-04	9.28E-04	1.31E-03	8.33E-04	7.46E-04	8.85E-04	8.23E-04
TM-170	128.6 D	9.71E-06	1.05E-05	1.01E-05	2.20E-05	9.04E-06	8.15E-06	9.88E-06	8.74E-06
TM-171	1.92 Y	1.02E-06	1.19E-06	1.05E-06	2.71E-06	9.30E-07	8.73E-07	1.04E-06	9.13E-07
YB-169	31.97 D	6.55E-04	6.52E-04	6.53E-04	1.20E-03	5.91E-04	5.33E-04	6.39E-04	5.84E-04
YB-175	4.19 D	9.78E-05	9.19E-05	9.98E-05	1.35E-04	8.89E-05	7.98E-05	9.44E-05	8.77E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
SM-151	90 Y	1.02E-09	3.44E-10	8.83E-10	1.28E-09	3.02E-10	5.78E-10	4.58E-10	1.47E-09
SM-153	46.7 H	1.26E-04	1.10E-04	1.22E-04	2.06E-04	8.50E-05	9.27E-05	7.87E-05	2.11E-04
EU-152	13.6 Y	3.02E-03	2.85E-03	3.04E-03	3.37E-03	3.05E-03	2.71E-03	2.45E-03	3.43E-03
EU-152M	9.32 H	8.29E-04	7.82E-04	8.35E-04	9.22E-04	8.35E-04	7.52E-04	6.70E-04	9.38E-04
EU-154	8.8 Y	3.32E-03	3.15E-03	3.36E-03	3.68E-03	3.37E-03	3.01E-03	2.72E-03	3.74E-03
EU-155	4.96 Y	1.35E-04	1.27E-04	1.40E-04	2.37E-04	1.02E-04	1.07E-04	9.29E-05	2.44E-04
EU-156	15.19 D	3.82E-03	3.61E-03	3.82E-03	4.03E-03	3.85E-03	3.38E-03	3.13E-03	4.09E-03
GD-152	1.1E14 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GD-153	241.6 D	2.21E-04	1.89E-04	2.10E-04	3.57E-04	1.41E-04	1.58E-04	1.32E-04	3.67E-04
GD-159	18.56 H	9.31E-05	8.67E-05	9.39E-05	1.22E-04	9.01E-05	7.94E-05	7.18E-05	1.24E-04
GD-162	9.7 M	1.04E-03	9.95E-04	1.07E-03	1.27E-03	1.10E-03	9.41E-04	8.57E-04	1.29E-03
TB-157	150 Y	7.12E-06	5.04E-06	5.60E-06	1.01E-05	2.48E-06	4.06E-06	2.81E-06	1.03E-05
TB-160	72.3 D	2.86E-03	2.72E-03	2.90E-03	3.18E-03	2.92E-03	2.60E-03	2.34E-03	3.24E-03
TB-162	7.76 M	2.85E-03	2.71E-03	2.91E-03	3.31E-03	2.94E-03	2.59E-03	2.34E-03	3.37E-03
DY-157	8.06 H	8.29E-04	7.84E-04	8.48E-04	1.09E-03	8.43E-04	7.16E-04	6.62E-04	1.11E-03
DY-165	2.334 H	6.11E-05	5.73E-05	6.20E-05	8.04E-05	5.72E-05	5.31E-05	4.68E-05	8.21E-05
DY-166	81.6 H	7.93E-05	6.91E-05	7.64E-05	1.29E-04	4.81E-05	5.78E-05	4.62E-05	1.32E-04
HO-166	26.80 H	7.20E-05	6.73E-05	7.21E-05	9.04E-05	6.40E-05	6.11E-05	5.43E-05	9.23E-05
HO-166M	1.20E3 Y	4.10E-03	3.91E-03	4.19E-03	4.81E-03	4.23E-03	3.73E-03	3.35E-03	4.90E-03
ER-169	9.40 D	3.77E-09	3.70E-09	4.15E-09	6.67E-09	3.42E-09	3.20E-09	2.98E-09	6.92E-09
ER-171	7.52 H	8.93E-04	8.57E-04	9.29E-04	1.22E-03	9.17E-04	7.78E-04	7.25E-04	1.25E-03
TM-170	128.6 D	1.11E-05	1.03E-05	1.14E-05	2.00E-05	7.12E-06	8.48E-06	6.92E-06	2.05E-05
TM-171	1.92 Y	1.31E-06	1.15E-06	1.28E-06	2.30E-06	6.63E-07	9.30E-07	6.99E-07	2.36E-06
YB-169	31.97 D	6.86E-04	6.41E-04	7.04E-04	1.09E-03	5.74E-04	5.49E-04	4.91E-04	1.12E-03
YB-175	4.19 D	9.51E-05	9.13E-05	9.87E-05	1.26E-04	9.84E-05	8.42E-05	7.75E-05	1.28E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
SM-151	90 Y	1.60E-08	4.63E-10	5.28E-10	4.20E-09	3.75E-10	1.73E-09	4.87E-11	3.06E-09
SM-153	46.7 H	2.28E-04	1.02E-04	1.04E-04	1.98E-04	1.45E-04	1.88E-04	8.76E-05	1.46E-04
EU-152	13.6 Y	4.66E-03	2.76E-03	2.80E-03	4.06E-03	3.20E-03	3.84E-03	2.50E-03	3.25E-03
EU-152M	9.32 H	1.29E-03	7.56E-04	7.71E-04	1.12E-03	8.84E-04	1.06E-03	6.79E-04	8.95E-04
EU-154	8.8 Y	5.12E-03	3.05E-03	3.10E-03	4.45E-03	3.54E-03	4.24E-03	2.77E-03	3.58E-03
EU-155	4.96 Y	2.34E-04	1.20E-04	1.22E-04	2.13E-04	1.62E-04	2.09E-04	1.04E-04	1.61E-04
EU-156	15.19 D	5.71E-03	3.47E-03	3.54E-03	5.00E-03	3.96E-03	4.69E-03	3.21E-03	4.05E-03
GD-152	1.1E14 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GD-153	241.6 D	4.05E-04	1.74E-04	1.78E-04	3.48E-04	2.53E-04	3.28E-04	1.48E-04	2.55E-04
GD-159	18.56 H	1.53E-04	8.37E-05	8.45E-05	1.33E-04	9.91E-05	1.24E-04	7.42E-05	1.04E-04
GD-162	9.7 M	1.64E-03	9.76E-04	9.82E-04	1.44E-03	1.09E-03	1.34E-03	8.72E-04	1.15E-03
TB-157	150 Y	1.49E-05	4.08E-06	4.41E-06	1.13E-05	7.62E-06	9.94E-06	3.35E-06	7.81E-06
TB-160	72.3 D	4.43E-03	2.63E-03	2.68E-03	3.85E-03	3.06E-03	3.66E-03	2.38E-03	3.09E-03
TB-162	7.76 M	4.45E-03	2.64E-03	2.68E-03	3.88E-03	3.05E-03	3.69E-03	2.37E-03	3.11E-03
DY-157	8.06 H	1.34E-03	7.66E-04	7.69E-04	1.18E-03	8.83E-04	1.10E-03	6.81E-04	9.26E-04
DY-165	2.334 H	1.00E-04	5.50E-05	5.59E-05	8.78E-05	6.67E-05	8.28E-05	4.86E-05	6.84E-05
DY-166	81.6 H	1.48E-04	6.19E-05	6.41E-05	1.26E-04	9.24E-05	1.19E-04	5.29E-05	9.25E-05
HO-166	26.80 H	1.15E-04	6.36E-05	6.47E-05	1.01E-04	7.88E-05	9.59E-05	5.77E-05	7.92E-05
HO-166M	1.20E3 Y	6.43E-03	3.80E-03	3.86E-03	5.61E-03	4.38E-03	5.32E-03	3.40E-03	4.48E-03
ER-169	9.40 D	1.67E-08	3.67E-09	3.65E-09	6.31E-09	4.52E-09	5.87E-09	3.18E-09	5.16E-09
ER-171	7.52 H	1.43E-03	8.42E-04	8.43E-04	1.28E-03	9.68E-04	1.21E-03	7.48E-04	1.01E-03
TM-170	128.6 D	2.03E-05	9.38E-06	9.62E-06	1.80E-05	1.36E-05	1.75E-05	8.05E-06	1.34E-05
TM-171	1.92 Y	2.53E-06	9.93E-07	1.04E-06	2.17E-06	1.59E-06	2.06E-06	8.33E-07	1.57E-06
YB-169	31.97 D	1.18E-03	6.09E-04	6.16E-04	1.05E-03	7.89E-04	1.01E-03	5.30E-04	8.01E-04
YB-175	4.19 D	1.52E-04	8.95E-05	8.98E-05	1.35E-04	1.02E-04	1.27E-04	7.97E-05	1.07E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
LU-177	6.71 D	8.54E-05	7.98E-05	8.41E-05	1.34E-04	7.67E-05	6.82E-05	8.18E-05	7.58E-05
LU-177M	160.10 D	2.44E-03	2.29E-03	2.45E-03	3.55E-03	2.21E-03	1.97E-03	2.35E-03	2.18E-03
HF-181	42.39 D	1.36E-03	1.29E-03	1.42E-03	1.82E-03	1.25E-03	1.12E-03	1.33E-03	1.23E-03
TA-182	114.74 D	3.31E-03	3.27E-03	3.65E-03	4.24E-03	3.21E-03	2.94E-03	3.43E-03	3.15E-03
W-181	120.95 D	6.48E-05	7.47E-05	6.80E-05	1.64E-04	6.03E-05	5.59E-05	6.63E-05	5.84E-05
W-185	75.1 D	6.70E-08	6.24E-08	6.66E-08	1.10E-07	6.14E-08	5.31E-08	6.59E-08	5.97E-08
W-187	23.83 H	1.20E-03	1.15E-03	1.28E-03	1.56E-03	1.13E-03	1.01E-03	1.20E-03	1.10E-03
W-188	69.4 D	4.44E-06	4.10E-06	4.42E-06	6.21E-06	3.98E-06	3.57E-06	4.21E-06	3.95E-06
RE-182	64.0 H	4.40E-03	4.31E-03	4.76E-03	5.91E-03	4.21E-03	3.84E-03	4.49E-03	4.14E-03
RE-182M	12.7 H	3.03E-03	3.02E-03	3.36E-03	3.97E-03	2.95E-03	2.71E-03	3.15E-03	2.89E-03
RE-183	70 D	3.21E-04	3.25E-04	3.25E-04	6.14E-04	2.93E-04	2.64E-04	3.16E-04	2.87E-04
RE-184	38.0 D	2.29E-03	2.23E-03	2.48E-03	2.93E-03	2.18E-03	1.97E-03	2.32E-03	2.13E-03
RE-184M	169 D	9.58E-04	9.29E-04	1.01E-03	1.35E-03	8.97E-04	8.10E-04	9.57E-04	8.79E-04
RE-186	90.64 H	4.74E-05	4.60E-05	4.77E-05	8.42E-05	4.35E-05	3.83E-05	4.67E-05	4.24E-05
RE-187	4.7E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RE-188	16.98 H	1.47E-04	1.40E-04	1.53E-04	2.06E-04	1.37E-04	1.22E-04	1.46E-04	1.34E-04
OS-185	93.6 D	1.78E-03	1.72E-03	1.91E-03	2.29E-03	1.68E-03	1.52E-03	1.79E-03	1.64E-03
OS-186	2.0E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OS-190M	9.9 M	4.03E-03	3.81E-03	4.22E-03	5.19E-03	3.72E-03	3.34E-03	3.95E-03	3.65E-03
OS-191	15.4 D	1.56E-04	1.57E-04	1.60E-04	3.02E-04	1.45E-04	1.28E-04	1.55E-04	1.40E-04
OS-191M	13.03 H	8.37E-06	9.34E-06	8.87E-06	2.04E-05	7.88E-06	7.18E-06	8.52E-06	7.55E-06
OS-193	30.0 H	1.63E-04	1.56E-04	1.69E-04	2.37E-04	1.50E-04	1.35E-04	1.60E-04	1.47E-04
IR-190	11.78 D	3.53E-03	3.36E-03	3.71E-03	4.61E-03	3.27E-03	2.95E-03	3.47E-03	3.21E-03
IR-190M	1.2 H	1.11E-08	7.87E-12	8.90E-10	8.71E-07	1.45E-09	2.20E-11	3.62E-11	4.57E-09
IR-190M	3.2 H	8.63E-05	9.64E-05	9.16E-05	2.03E-04	8.13E-05	7.42E-05	8.80E-05	7.79E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
LU-177	6.71 D	8.22E-05	7.93E-05	8.68E-05	1.26E-04	8.08E-05	6.91E-05	6.55E-05	1.30E-04
LU-177M	160.10 D	2.36E-03	2.27E-03	2.47E-03	3.33E-03	2.40E-03	2.05E-03	1.91E-03	3.40E-03
HF-181	42.39 D	1.33E-03	1.28E-03	1.38E-03	1.70E-03	1.38E-03	1.20E-03	1.09E-03	1.73E-03
TA-182	114.74 D	3.43E-03	3.25E-03	3.46E-03	3.82E-03	3.43E-03	3.09E-03	2.79E-03	3.89E-03
W-181	120.95 D	8.05E-05	7.25E-05	8.03E-05	1.44E-04	4.35E-05	5.88E-05	4.50E-05	1.48E-04
W-185	75.1 D	6.33E-08	6.23E-08	6.88E-08	1.08E-07	6.03E-08	5.37E-08	5.07E-08	1.11E-07
W-187	23.83 H	1.20E-03	1.15E-03	1.23E-03	1.44E-03	1.23E-03	1.10E-03	9.76E-04	1.46E-03
W-188	69.4 D	4.23E-06	4.08E-06	4.42E-06	5.83E-06	4.46E-06	3.67E-06	3.49E-06	5.95E-06
RE-182	64.0 H	4.51E-03	4.29E-03	4.59E-03	5.38E-03	4.50E-03	4.01E-03	3.65E-03	5.48E-03
RE-182M	12.7 H	3.17E-03	3.00E-03	3.20E-03	3.57E-03	3.13E-03	2.83E-03	2.55E-03	3.64E-03
RE-183	70 D	3.41E-04	3.21E-04	3.53E-04	5.65E-04	2.71E-04	2.72E-04	2.38E-04	5.79E-04
RE-184	38.0 D	2.33E-03	2.21E-03	2.36E-03	2.67E-03	2.34E-03	2.12E-03	1.88E-03	2.72E-03
RE-184M	169 D	9.69E-04	9.22E-04	9.94E-04	1.24E-03	9.48E-04	8.57E-04	7.69E-04	1.27E-03
RE-186	90.64 H	4.73E-05	4.57E-05	5.04E-05	8.04E-05	4.12E-05	3.90E-05	3.55E-05	8.25E-05
RE-187	4.7E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RE-188	16.98 H	1.45E-04	1.39E-04	1.51E-04	1.94E-04	1.45E-04	1.28E-04	1.17E-04	1.98E-04
OS-185	93.6 D	1.80E-03	1.71E-03	1.83E-03	2.10E-03	1.82E-03	1.64E-03	1.45E-03	2.14E-03
OS-186	2.0E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OS-190M	9.9 M	3.95E-03	3.79E-03	4.07E-03	4.81E-03	4.14E-03	3.59E-03	3.25E-03	4.89E-03
OS-191	15.4 D	1.62E-04	1.56E-04	1.72E-04	2.86E-04	1.27E-04	1.31E-04	1.15E-04	2.94E-04
OS-191M	13.03 H	9.85E-06	9.17E-06	1.01E-05	1.80E-05	5.84E-06	7.46E-06	5.88E-06	1.85E-05
OS-193	30.0 H	1.62E-04	1.55E-04	1.68E-04	2.22E-04	1.60E-04	1.42E-04	1.29E-04	2.26E-04
IR-190	11.78 D	3.49E-03	3.34E-03	3.59E-03	4.27E-03	3.61E-03	3.16E-03	2.85E-03	4.35E-03
IR-190M	1.2 H	2.77E-11	1.13E-10	8.81E-09	5.29E-09	2.89E-09	4.36E-09	6.50E-09	1.43E-08
IR-190M	3.2 H	1.02E-04	9.47E-05	1.04E-04	1.86E-04	6.02E-05	7.70E-05	6.07E-05	1.91E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
LU-177	6.71 D	1.34E-04	7.81E-05	7.78E-05	1.22E-04	9.30E-05	1.18E-04	6.89E-05	9.51E-05
LU-177M	160.10 D	3.81E-03	2.23E-03	2.23E-03	3.42E-03	2.59E-03	3.25E-03	1.98E-03	2.68E-03
HF-181	42.39 D	2.12E-03	1.25E-03	1.26E-03	1.88E-03	1.42E-03	1.76E-03	1.12E-03	1.49E-03
TA-182	114.74 D	5.28E-03	3.14E-03	3.19E-03	4.60E-03	3.67E-03	4.39E-03	2.86E-03	3.70E-03
W-181	120.95 D	1.52E-04	6.35E-05	6.62E-05	1.33E-04	9.93E-05	1.28E-04	5.41E-05	9.66E-05
W-185	75.1 D	1.03E-07	6.20E-08	6.16E-08	9.69E-08	7.48E-08	9.62E-08	5.43E-08	7.54E-08
W-187	23.83 H	1.90E-03	1.11E-03	1.13E-03	1.66E-03	1.28E-03	1.56E-03	9.94E-04	1.32E-03
W-188	69.4 D	6.73E-06	4.03E-06	4.02E-06	6.05E-06	4.58E-06	5.74E-06	3.59E-06	4.77E-06
RE-182	64.0 H	7.03E-03	4.16E-03	4.20E-03	6.18E-03	4.87E-03	5.90E-03	3.76E-03	4.93E-03
RE-182M	12.7 H	4.90E-03	2.89E-03	2.94E-03	4.27E-03	3.40E-03	4.07E-03	2.63E-03	3.42E-03
RE-183	70 D	5.91E-04	3.02E-04	3.06E-04	5.30E-04	4.02E-04	5.13E-04	2.63E-04	4.01E-04
RE-184	38.0 D	3.66E-03	2.13E-03	2.18E-03	3.17E-03	2.51E-03	3.03E-03	1.91E-03	2.54E-03
RE-184M	169 D	1.55E-03	8.92E-04	9.04E-04	1.36E-03	1.06E-03	1.30E-03	7.95E-04	1.08E-03
RE-186	90.64 H	7.97E-05	4.43E-05	4.44E-05	7.32E-05	5.62E-05	7.20E-05	3.87E-05	5.62E-05
RE-187	4.7E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RE-188	16.98 H	2.30E-04	1.36E-04	1.37E-04	2.05E-04	1.60E-04	1.97E-04	1.22E-04	1.62E-04
OS-185	93.6 D	2.84E-03	1.65E-03	1.68E-03	2.47E-03	1.92E-03	2.33E-03	1.48E-03	1.97E-03
OS-186	2.0E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OS-190M	9.9 M	6.24E-03	3.70E-03	3.74E-03	5.48E-03	4.17E-03	5.12E-03	3.31E-03	4.36E-03
OS-191	15.4 D	2.81E-04	1.48E-04	1.49E-04	2.56E-04	1.97E-04	2.52E-04	1.29E-04	1.94E-04
OS-191M	13.03 H	1.96E-05	8.18E-06	8.45E-06	1.62E-05	1.23E-05	1.57E-05	7.09E-06	1.19E-05
OS-193	30.0 H	2.62E-04	1.51E-04	1.52E-04	2.33E-04	1.77E-04	2.21E-04	1.34E-04	1.83E-04
IR-190	11.78 D	5.52E-03	3.25E-03	3.29E-03	4.85E-03	3.71E-03	4.55E-03	2.91E-03	3.85E-03
IR-190M	1.2 H	1.86E-06	2.51E-09	2.27E-09	8.08E-08	9.51E-12	5.58E-09	2.45E-12	1.11E-07
IR-190M	3.2 H	1.86E-04	8.44E-05	8.72E-05	1.66E-04	1.27E-04	1.63E-04	7.32E-05	1.22E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
IR-192	74.02 D	2.08E-03	1.94E-03	2.13E-03	2.72E-03	1.89E-03	1.70E-03	2.01E-03	1.87E-03
IR-193M	11.9 D	6.36E-07	6.91E-07	6.65E-07	2.28E-06	5.92E-07	5.36E-07	6.37E-07	5.69E-07
IR-194	19.15 H	2.34E-04	2.21E-04	2.45E-04	3.01E-04	2.17E-04	1.96E-04	2.30E-04	2.14E-04
IR-194M	171 D	5.95E-03	5.64E-03	6.26E-03	7.57E-03	5.51E-03	4.96E-03	5.85E-03	5.41E-03
PT-191	2.71 D	6.72E-04	6.60E-04	7.02E-04	1.05E-03	6.22E-04	5.59E-04	6.63E-04	6.07E-04
PT-193	50 Y	1.08E-08	1.95E-15	8.64E-10	8.49E-07	1.41E-09	1.82E-11	2.68E-11	4.45E-09
PT-193M	4.33 D	2.03E-05	2.22E-05	2.16E-05	4.64E-05	1.92E-05	1.74E-05	2.07E-05	1.84E-05
PT-195M	4.02 D	1.41E-04	1.49E-04	1.47E-04	3.02E-04	1.32E-04	1.18E-04	1.43E-04	1.27E-04
PT-197	18.3 H	5.18E-05	5.18E-05	5.32E-05	9.67E-05	4.80E-05	4.27E-05	5.12E-05	4.64E-05
PT-197M	94.4 M	1.83E-04	1.80E-04	1.88E-04	3.03E-04	1.68E-04	1.51E-04	1.78E-04	1.64E-04
AU-194	39.5 H	2.79E-03	2.76E-03	3.07E-03	3.66E-03	2.72E-03	2.49E-03	2.89E-03	2.67E-03
AU-195	183 D	1.62E-04	1.74E-04	1.71E-04	3.54E-04	1.53E-04	1.37E-04	1.65E-04	1.47E-04
AU-195M	30.6 S	4.97E-04	4.61E-04	4.94E-04	7.11E-04	4.46E-04	4.00E-04	4.72E-04	4.42E-04
AU-196	6.183 D	1.17E-03	1.10E-03	1.20E-03	1.63E-03	1.06E-03	9.56E-04	1.13E-03	1.05E-03
AU-198	2.696 D	1.02E-03	9.60E-04	1.06E-03	1.32E-03	9.37E-04	8.42E-04	9.92E-04	9.22E-04
AU-199	3.139 D	2.20E-04	2.05E-04	2.18E-04	3.49E-04	1.99E-04	1.76E-04	2.12E-04	1.96E-04
HG-197	64.14 H	1.34E-04	1.44E-04	1.42E-04	2.91E-04	1.27E-04	1.14E-04	1.36E-04	1.21E-04
HG-197M	23.8 H	2.14E-04	2.07E-04	2.16E-04	3.70E-04	1.97E-04	1.73E-04	2.10E-04	1.91E-04
HG-203	46.60 D	5.77E-04	5.33E-04	5.76E-04	8.02E-04	5.18E-04	4.64E-04	5.48E-04	5.13E-04
TL-200	26.1 H	3.35E-03	3.26E-03	3.64E-03	4.31E-03	3.20E-03	2.92E-03	3.40E-03	3.14E-03
TL-201	73.06 H	1.93E-04	1.99E-04	2.00E-04	3.84E-04	1.81E-04	1.61E-04	1.93E-04	1.74E-04
TL-202	12.23 D	1.15E-03	1.09E-03	1.20E-03	1.57E-03	1.06E-03	9.50E-04	1.12E-03	1.04E-03
TL-204	3.779 Y	2.17E-06	2.33E-06	2.30E-06	4.71E-06	2.06E-06	1.84E-06	2.21E-06	1.96E-06
TL-207	4.77 M	5.72E-06	5.55E-06	6.25E-06	6.98E-06	5.48E-06	4.97E-06	5.83E-06	5.36E-06
TL-208	3.053 M	9.53E-03	9.72E-03	1.08E-02	1.23E-02	9.70E-03	9.04E-03	1.03E-02	9.55E-03

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
IR-192	74.02 D	2.01E-03	1.93E-03	2.08E-03	2.54E-03	2.13E-03	1.80E-03	1.66E-03	2.58E-03
IR-193M	11.9 D	7.25E-07	6.80E-07	7.58E-07	1.34E-06	4.46E-07	5.58E-07	4.48E-07	1.38E-06
IR-194	19.15 H	2.30E-04	2.20E-04	2.36E-04	2.78E-04	2.42E-04	2.07E-04	1.90E-04	2.83E-04
IR-194M	171 D	5.85E-03	5.60E-03	6.02E-03	7.01E-03	6.15E-03	5.34E-03	4.82E-03	7.13E-03
PT-191	2.71 D	6.86E-04	6.55E-04	7.10E-04	9.76E-04	6.33E-04	5.93E-04	5.23E-04	9.96E-04
PT-193	50 Y	1.30E-11	1.05E-10	8.57E-09	5.15E-09	2.81E-09	4.25E-09	6.33E-09	1.39E-08
PT-193M	4.33 D	2.32E-05	2.19E-05	2.42E-05	4.27E-05	1.47E-05	1.79E-05	1.44E-05	4.38E-05
PT-195M	4.02 D	1.55E-04	1.47E-04	1.63E-04	2.83E-04	1.06E-04	1.22E-04	1.01E-04	2.90E-04
PT-197	18.3 H	5.33E-05	5.15E-05	5.66E-05	9.22E-05	4.34E-05	4.34E-05	3.83E-05	9.46E-05
PT-197M	94.4 M	1.87E-04	1.78E-04	1.94E-04	2.82E-04	1.67E-04	1.57E-04	1.40E-04	2.88E-04
AU-194	39.5 H	2.91E-03	2.76E-03	2.94E-03	3.30E-03	2.95E-03	2.56E-03	2.37E-03	3.36E-03
AU-195	183 D	1.81E-04	1.72E-04	1.90E-04	3.33E-04	1.20E-04	1.42E-04	1.16E-04	3.42E-04
AU-195M	30.6 S	4.75E-04	4.59E-04	4.97E-04	6.69E-04	4.94E-04	4.10E-04	3.89E-04	6.83E-04
AU-196	6.183 D	1.14E-03	1.10E-03	1.19E-03	1.52E-03	1.17E-03	1.01E-03	9.25E-04	1.55E-03
AU-198	2.696 D	9.93E-04	9.55E-04	1.03E-03	1.23E-03	1.06E-03	9.01E-04	8.23E-04	1.25E-03
AU-199	3.139 D	2.10E-04	2.05E-04	2.24E-04	3.36E-04	2.05E-04	1.77E-04	1.68E-04	3.44E-04
HG-197	64.14 H	1.49E-04	1.42E-04	1.57E-04	2.75E-04	9.92E-05	1.17E-04	9.60E-05	2.83E-04
HG-197M	23.8 H	2.11E-04	2.06E-04	2.26E-04	3.55E-04	1.89E-04	1.76E-04	1.61E-04	3.64E-04
HG-203	46.60 D	5.50E-04	5.31E-04	5.75E-04	7.55E-04	5.80E-04	4.79E-04	4.54E-04	7.70E-04
TL-200	26.1 H	3.41E-03	3.25E-03	3.47E-03	3.92E-03	3.47E-03	3.07E-03	2.79E-03	3.99E-03
TL-201	73.06 H	2.05E-04	1.97E-04	2.17E-04	3.66E-04	1.54E-04	1.64E-04	1.41E-04	3.76E-04
TL-202	12.23 D	1.13E-03	1.09E-03	1.17E-03	1.46E-03	1.15E-03	1.02E-03	9.15E-04	1.49E-03
TL-204	3.779 Y	2.41E-06	2.31E-06	2.54E-06	4.47E-06	1.60E-06	1.89E-06	1.55E-06	4.59E-06
TL-207	4.77 M	5.81E-06	5.52E-06	5.88E-06	6.34E-06	5.96E-06	5.36E-06	4.76E-06	6.45E-06
TL-208	3.053 M	1.05E-02	9.77E-03	1.02E-02	1.07E-02	1.05E-02	8.80E-03	8.55E-03	1.09E-02

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
IR-192	74.02 D	3.18E-03	1.90E-03	1.91E-03	2.81E-03	2.13E-03	2.63E-03	1.70E-03	2.23E-03
IR-193M	11.9 D	3.11E-06	6.13E-07	6.31E-07	1.26E-06	9.10E-07	1.16E-06	5.31E-07	9.80E-07
IR-194	19.15 H	3.60E-04	2.16E-04	2.17E-04	3.17E-04	2.45E-04	2.99E-04	1.94E-04	2.53E-04
IR-194M	171 D	9.22E-03	5.48E-03	5.53E-03	8.08E-03	6.17E-03	7.55E-03	4.90E-03	6.44E-03
PT-191	2.71 D	1.13E-03	6.27E-04	6.35E-04	1.00E-03	7.66E-04	9.55E-04	5.56E-04	7.80E-04
PT-193	50 Y	1.81E-06	2.44E-09	2.21E-09	7.87E-08	1.81E-12	5.42E-09	7.91E-13	1.08E-07
PT-193M	4.33 D	4.34E-05	1.98E-05	2.04E-05	3.77E-05	2.91E-05	3.71E-05	1.73E-05	2.80E-05
PT-195M	4.02 D	2.78E-04	1.36E-04	1.39E-04	2.50E-04	1.92E-04	2.46E-04	1.18E-04	1.87E-04
PT-197	18.3 H	9.17E-05	4.89E-05	4.94E-05	8.30E-05	6.44E-05	8.18E-05	4.31E-05	6.33E-05
PT-197M	94.4 M	3.14E-04	1.70E-04	1.72E-04	2.79E-04	2.12E-04	2.67E-04	1.51E-04	2.15E-04
AU-194	39.5 H	4.43E-03	2.67E-03	2.70E-03	3.90E-03	3.05E-03	3.66E-03	2.45E-03	3.13E-03
AU-195	183 D	3.24E-04	1.58E-04	1.61E-04	2.93E-04	2.26E-04	2.89E-04	1.37E-04	2.19E-04
AU-195M	30.6 S	7.62E-04	4.52E-04	4.51E-04	6.84E-04	5.19E-04	6.51E-04	4.03E-04	5.38E-04
AU-196	6.183 D	1.83E-03	1.07E-03	1.08E-03	1.63E-03	1.23E-03	1.53E-03	9.56E-04	1.28E-03
AU-198	2.696 D	1.57E-03	9.37E-04	9.42E-04	1.38E-03	1.04E-03	1.29E-03	8.38E-04	1.10E-03
AU-199	3.139 D	3.42E-04	2.02E-04	2.01E-04	3.14E-04	2.42E-04	3.08E-04	1.79E-04	2.45E-04
HG-197	64.14 H	2.66E-04	1.30E-04	1.33E-04	2.41E-04	1.87E-04	2.38E-04	1.14E-04	1.80E-04
HG-197M	23.8 H	3.55E-04	2.00E-04	2.00E-04	3.24E-04	2.50E-04	3.19E-04	1.76E-04	2.50E-04
HG-203	46.60 D	8.75E-04	5.24E-04	5.23E-04	7.85E-04	5.95E-04	7.44E-04	4.67E-04	6.20E-04
TL-200	26.1 H	5.29E-03	3.15E-03	3.19E-03	4.63E-03	3.63E-03	4.38E-03	2.85E-03	3.71E-03
TL-201	73.06 H	3.56E-04	1.84E-04	1.87E-04	3.25E-04	2.52E-04	3.21E-04	1.62E-04	2.45E-04
TL-202	12.23 D	1.82E-03	1.06E-03	1.07E-03	1.60E-03	1.21E-03	1.50E-03	9.45E-04	1.27E-03
TL-204	3.779 Y	4.30E-06	2.11E-06	2.16E-06	3.90E-06	3.03E-06	3.86E-06	1.85E-06	2.91E-06
TL-207	4.77 M	9.00E-06	5.35E-06	5.45E-06	7.78E-06	6.21E-06	7.43E-06	4.80E-06	6.26E-06
TL-208	3.053 M	1.49E-02	9.38E-03	9.64E-03	1.34E-02	1.05E-02	1.22E-02	8.75E-03	1.08E-02

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
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NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
TL-209	2.20 M	5.44E-03	5.42E-03	6.06E-03	6.99E-03	5.35E-03	4.92E-03	5.70E-03	5.25E-03
TL-210	1.30 M	7.35E-03	7.27E-03	8.14E-03	9.26E-03	7.21E-03	6.61E-03	7.66E-03	7.07E-03
PB-203	52.02 H	7.36E-04	6.97E-04	7.44E-04	1.10E-03	6.68E-04	5.98E-04	7.08E-04	6.57E-04
PB-204M	66.9 M	5.46E-03	5.27E-03	5.90E-03	6.75E-03	5.19E-03	4.70E-03	5.52E-03	5.08E-03
PB-205	1.51E7 Y	1.49E-08	7.01E-15	1.23E-09	1.10E-06	2.00E-09	3.14E-11	2.66E-11	6.30E-09
PB-209	3.253 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB-210	22.26 Y	2.21E-06	2.88E-06	2.07E-06	8.41E-06	1.86E-06	1.88E-06	2.34E-06	1.95E-06
PB-211	36.1 M	1.31E-04	1.25E-04	1.40E-04	1.64E-04	1.23E-04	1.11E-04	1.31E-04	1.21E-04
PB-212	10.643 H	3.63E-04	3.40E-04	3.62E-04	5.47E-04	3.27E-04	2.92E-04	3.47E-04	3.23E-04
PB-214	26.8 M	6.25E-04	5.84E-04	6.36E-04	8.53E-04	5.68E-04	5.09E-04	6.01E-04	5.60E-04
BI-206	6.243 D	8.52E-03	8.33E-03	9.32E-03	1.08E-02	8.20E-03	7.47E-03	8.72E-03	8.03E-03
BI-207	33.4 Y	3.97E-03	3.87E-03	4.33E-03	5.01E-03	3.81E-03	3.46E-03	4.05E-03	3.73E-03
BI-208	3.68E5 Y	7.66E-03	7.94E-03	8.78E-03	1.00E-02	7.95E-03	7.46E-03	8.44E-03	7.83E-03
BI-210	5.013 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BI-211	2.13 M	1.20E-04	1.12E-04	1.22E-04	1.60E-04	1.08E-04	9.74E-05	1.15E-04	1.07E-04
BI-212	60.55 M	4.77E-04	4.68E-04	5.25E-04	5.93E-04	4.62E-04	4.21E-04	4.91E-04	4.52E-04
BI-213	45.65 M	3.51E-04	3.32E-04	3.67E-04	4.53E-04	3.24E-04	2.91E-04	3.43E-04	3.18E-04
BI-214	19.9 M	3.99E-03	3.98E-03	4.47E-03	5.01E-03	3.95E-03	3.63E-03	4.20E-03	3.87E-03
PO-209	102 Y	8.91E-06	8.56E-06	9.47E-06	1.17E-05	8.38E-06	7.57E-06	8.91E-06	8.22E-06
PO-210	138.378 D	2.23E-08	2.15E-08	2.42E-08	2.72E-08	2.12E-08	1.92E-08	2.26E-08	2.07E-08
PO-211	0.516 S	2.02E-05	1.95E-05	2.18E-05	2.49E-05	1.92E-05	1.73E-05	2.04E-05	1.87E-05
PO-212	2.98E-7 S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PO-213	4.2E-6 S	7.96E-08	7.67E-08	8.62E-08	9.74E-08	7.56E-08	6.83E-08	8.04E-08	7.39E-08
PO-214	1.637E-4 S	2.18E-07	2.10E-07	2.37E-07	2.67E-07	2.07E-07	1.88E-07	2.21E-07	2.03E-07
PO-215	1.778E-3 S	3.77E-07	3.54E-07	3.92E-07	4.81E-07	3.46E-07	3.11E-07	3.67E-07	3.40E-07

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
TL-209	2.20 M	5.69E-03	5.41E-03	5.74E-03	6.27E-03	5.76E-03	5.05E-03	4.67E-03	6.38E-03
TL-210	1.30 M	7.68E-03	7.27E-03	7.71E-03	8.29E-03	7.82E-03	6.82E-03	6.30E-03	8.43E-03
PB-203	52.02 H	7.19E-04	6.93E-04	7.53E-04	1.04E-03	7.11E-04	6.18E-04	5.72E-04	1.06E-03
PB-204M	66.9 M	5.51E-03	5.24E-03	5.59E-03	6.15E-03	5.68E-03	5.05E-03	4.52E-03	6.26E-03
PB-205	1.51E7 Y	2.45E-11	1.73E-10	1.20E-08	7.64E-09	3.97E-09	5.97E-09	8.78E-09	1.95E-08
PB-209	3.253 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB-210	22.26 Y	3.40E-06	2.57E-06	2.87E-06	5.16E-06	1.31E-06	2.08E-06	1.47E-06	5.30E-06
PB-211	36.1 M	1.31E-04	1.25E-04	1.34E-04	1.51E-04	1.36E-04	1.20E-04	1.07E-04	1.53E-04
PB-212	10.643 H	3.50E-04	3.38E-04	3.68E-04	5.19E-04	3.50E-04	2.98E-04	2.81E-04	5.31E-04
PB-214	26.8 M	6.04E-04	5.81E-04	6.28E-04	7.99E-04	6.32E-04	5.34E-04	4.96E-04	8.14E-04
BI-206	6.243 D	8.72E-03	8.29E-03	8.84E-03	9.76E-03	8.90E-03	7.90E-03	7.13E-03	9.92E-03
BI-207	33.4 Y	4.05E-03	3.85E-03	4.11E-03	4.55E-03	4.12E-03	3.69E-03	3.31E-03	4.63E-03
BI-208	3.68E5 Y	8.60E-03	8.00E-03	8.35E-03	8.58E-03	8.52E-03	7.08E-03	7.01E-03	8.72E-03
BI-210	5.013 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BI-211	2.13 M	1.15E-04	1.11E-04	1.20E-04	1.50E-04	1.22E-04	1.03E-04	9.52E-05	1.52E-04
BI-212	60.55 M	4.91E-04	4.66E-04	4.95E-04	5.34E-04	5.02E-04	4.45E-04	4.02E-04	5.43E-04
BI-213	45.65 M	3.43E-04	3.30E-04	3.55E-04	4.21E-04	3.61E-04	3.12E-04	2.83E-04	4.28E-04
BI-214	19.9 M	4.20E-03	3.98E-03	4.21E-03	4.46E-03	4.27E-03	3.74E-03	3.45E-03	4.53E-03
PO-209	102 Y	8.92E-06	8.51E-06	9.13E-06	1.08E-05	9.07E-06	8.03E-06	7.25E-06	1.10E-05
PO-210	138.378 D	2.25E-08	2.14E-08	2.28E-08	2.48E-08	2.32E-08	2.08E-08	1.84E-08	2.53E-08
PO-211	0.516 S	2.03E-05	1.93E-05	2.07E-05	2.27E-05	2.10E-05	1.87E-05	1.67E-05	2.31E-05
PO-212	2.98E-7 S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PO-213	4.2E-6 S	8.02E-08	7.62E-08	8.14E-08	8.89E-08	8.28E-08	7.41E-08	6.57E-08	9.04E-08
PO-214	1.637E-4 S	2.20E-07	2.09E-07	2.23E-07	2.43E-07	2.27E-07	2.03E-07	1.80E-07	2.47E-07
PO-215	1.778E-3 S	3.67E-07	3.52E-07	3.79E-07	4.47E-07	3.90E-07	3.34E-07	3.04E-07	4.55E-07

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
TL-209	2.20 M	8.62E-03	5.24E-03	5.28E-03	7.57E-03	5.95E-03	7.11E-03	4.82E-03	6.10E-03
TL-210	1.30 M	1.16E-02	7.02E-03	7.14E-03	1.01E-02	8.00E-03	9.51E-03	6.44E-03	8.18E-03
PB-203	52.02 H	1.17E-03	6.76E-04	6.78E-04	1.05E-03	7.99E-04	1.00E-03	6.01E-04	8.20E-04
PB-204M	66.9 M	8.55E-03	5.09E-03	5.18E-03	7.42E-03	5.87E-03	7.06E-03	4.57E-03	5.96E-03
PB-205	1.51E7 Y	2.30E-06	3.53E-09	3.23E-09	1.08E-07	3.84E-12	8.10E-09	1.01E-12	1.45E-07
PB-209	3.253 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB-210	22.26 Y	9.52E-06	2.11E-06	2.27E-06	5.65E-06	3.79E-06	4.95E-06	1.74E-06	4.02E-06
PB-211	36.1 M	2.05E-04	1.21E-04	1.23E-04	1.78E-04	1.39E-04	1.68E-04	1.09E-04	1.43E-04
PB-212	10.643 H	5.65E-04	3.32E-04	3.32E-04	5.12E-04	3.91E-04	4.93E-04	2.95E-04	4.01E-04
PB-214	26.8 M	9.61E-04	5.71E-04	5.73E-04	8.56E-04	6.49E-04	8.07E-04	5.10E-04	6.77E-04
BI-206	6.243 D	1.35E-02	8.03E-03	8.16E-03	1.17E-02	9.23E-03	1.11E-02	7.28E-03	9.42E-03
BI-207	33.4 Y	6.28E-03	3.73E-03	3.79E-03	5.47E-03	4.31E-03	5.17E-03	3.37E-03	4.39E-03
BI-208	3.68E5 Y	1.20E-02	7.65E-03	7.88E-03	1.08E-02	8.52E-03	9.83E-03	7.20E-03	8.80E-03
BI-210	5.013 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BI-211	2.13 M	1.83E-04	1.09E-04	1.09E-04	1.63E-04	1.23E-04	1.52E-04	9.75E-05	1.29E-04
BI-212	60.55 M	7.53E-04	4.51E-04	4.58E-04	6.54E-04	5.16E-04	6.17E-04	4.10E-04	5.27E-04
BI-213	45.65 M	5.43E-04	3.23E-04	3.25E-04	4.78E-04	3.62E-04	4.45E-04	2.89E-04	3.80E-04
BI-214	19.9 M	6.31E-03	3.84E-03	3.90E-03	5.52E-03	4.37E-03	5.17E-03	3.54E-03	4.47E-03
PO-209	102 Y	1.40E-05	8.27E-06	8.39E-06	1.23E-05	9.65E-06	1.17E-05	7.41E-06	9.79E-06
PO-210	138.378 D	3.50E-08	2.07E-08	2.11E-08	3.03E-08	2.39E-08	2.88E-08	1.86E-08	2.43E-08
PO-211	0.516 S	3.17E-05	1.88E-05	1.91E-05	2.75E-05	2.16E-05	2.60E-05	1.68E-05	2.20E-05
PO-212	2.98E-7 S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PO-213	4.2E-6 S	1.25E-07	7.40E-08	7.54E-08	1.08E-07	8.53E-08	1.03E-07	6.63E-08	8.68E-08
PO-214	1.637E-4 S	3.43E-07	2.03E-07	2.07E-07	2.96E-07	2.34E-07	2.81E-07	1.82E-07	2.38E-07
PO-215	1.778E-3 S	5.80E-07	3.45E-07	3.48E-07	5.10E-07	3.84E-07	4.72E-07	3.09E-07	4.06E-07

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
PO-216	0.146 S	3.80E-08	3.66E-08	4.12E-08	4.64E-08	3.61E-08	3.27E-08	3.84E-08	3.53E-08
PO-218	3.05 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AT-211	7.214 H	8.19E-05	8.41E-05	8.59E-05	1.62E-04	7.75E-05	6.83E-05	8.28E-05	7.39E-05
AT-217	0.0323 S	6.07E-07	5.79E-07	6.48E-07	7.55E-07	5.68E-07	5.11E-07	6.03E-07	5.56E-07
RN-218	0.035 S	1.93E-06	1.84E-06	2.06E-06	2.40E-06	1.81E-06	1.63E-06	1.92E-06	1.77E-06
RN-219	3.96 S	1.45E-04	1.35E-04	1.47E-04	1.95E-04	1.31E-04	1.18E-04	1.39E-04	1.30E-04
RN-220	55.61 S	1.33E-06	1.26E-06	1.41E-06	1.66E-06	1.24E-06	1.11E-06	1.31E-06	1.21E-06
RN-222	3.8235 D	9.85E-07	9.35E-07	1.04E-06	1.24E-06	9.14E-07	8.22E-07	9.70E-07	8.96E-07
FR-221	4.8 M	7.77E-05	7.14E-05	7.62E-05	1.13E-04	6.93E-05	6.19E-05	7.35E-05	6.88E-05
FR-223	21.8 M	1.04E-04	1.05E-04	1.06E-04	1.94E-04	9.52E-05	8.61E-05	1.03E-04	9.36E-05
RA-222	38.0 S	2.34E-05	2.16E-05	2.36E-05	3.12E-05	2.11E-05	1.89E-05	2.23E-05	2.09E-05
RA-223	11.434 D	3.26E-04	3.09E-04	3.30E-04	5.08E-04	2.97E-04	2.64E-04	3.16E-04	2.91E-04
RA-224	3.62 D	2.54E-05	2.33E-05	2.50E-05	3.58E-05	2.26E-05	2.03E-05	2.40E-05	2.25E-05
RA-225	14.8 D	1.03E-05	1.52E-05	8.52E-06	4.22E-05	7.85E-06	8.67E-06	1.17E-05	8.96E-06
RA-226	1600 Y	1.69E-05	1.56E-05	1.66E-05	2.55E-05	1.52E-05	1.34E-05	1.61E-05	1.50E-05
RA-228	5.75 Y	1.56E-14	2.81E-21	1.24E-15	1.22E-12	2.03E-15	2.62E-17	3.85E-17	6.40E-15
AC-225	10.0 D	3.19E-05	3.05E-05	3.21E-05	5.58E-05	2.93E-05	2.57E-05	3.14E-05	2.85E-05
AC-227	21.773 Y	2.86E-07	2.67E-07	2.84E-07	5.90E-07	2.62E-07	2.26E-07	2.81E-07	2.55E-07
AC-228	6.13 H	2.41E-03	2.35E-03	2.63E-03	3.01E-03	2.32E-03	2.11E-03	2.47E-03	2.27E-03
TH-226	30.9 M	1.89E-05	1.78E-05	1.88E-05	3.13E-05	1.73E-05	1.51E-05	1.85E-05	1.69E-05
TH-227	18.718 D	2.59E-04	2.41E-04	2.58E-04	3.79E-04	2.33E-04	2.08E-04	2.47E-04	2.31E-04
TH-228	1.9132 Y	4.56E-06	4.39E-06	4.60E-06	8.56E-06	4.19E-06	3.69E-06	4.46E-06	4.07E-06
TH-229	7.34E3 Y	2.01E-04	1.94E-04	2.03E-04	3.61E-04	1.85E-04	1.62E-04	1.98E-04	1.79E-04
TH-230	7.7E4 Y	8.03E-07	8.13E-07	8.17E-07	2.20E-06	7.36E-07	6.57E-07	7.85E-07	7.16E-07
TH-231	25.52 H	2.46E-05	2.46E-05	2.47E-05	5.91E-05	2.25E-05	1.98E-05	2.49E-05	2.19E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
PO-216	0.146 S	3.83E-08	3.64E-08	3.89E-08	4.23E-08	3.95E-08	3.54E-08	3.14E-08	4.30E-08
PO-218	3.05 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AT-211	7.214 H	8.62E-05	8.36E-05	9.22E-05	1.56E-04	6.46E-05	7.01E-05	5.99E-05	1.61E-04
AT-217	0.0323 S	6.03E-07	5.76E-07	6.17E-07	6.96E-07	6.30E-07	5.57E-07	4.96E-07	7.07E-07
RN-218	0.035 S	1.92E-06	1.83E-06	1.96E-06	2.21E-06	2.01E-06	1.78E-06	1.58E-06	2.24E-06
RN-219	3.96 S	1.39E-04	1.34E-04	1.45E-04	1.83E-04	1.48E-04	1.23E-04	1.15E-04	1.86E-04
RN-220	55.61 S	1.31E-06	1.26E-06	1.35E-06	1.54E-06	1.38E-06	1.21E-06	1.08E-06	1.56E-06
RN-222	3.8235 D	9.70E-07	9.30E-07	9.98E-07	1.15E-06	1.02E-06	8.93E-07	8.00E-07	1.17E-06
FR-221	4.8 M	7.34E-05	7.11E-05	7.74E-05	1.07E-04	7.62E-05	6.26E-05	6.03E-05	1.10E-04
FR-223	21.8 M	1.12E-04	1.04E-04	1.14E-04	1.72E-04	9.11E-05	9.04E-05	7.86E-05	1.76E-04
RA-222	38.0 S	2.23E-05	2.15E-05	2.33E-05	2.92E-05	2.39E-05	1.98E-05	1.86E-05	2.97E-05
RA-223	11.434 D	3.17E-04	3.08E-04	3.36E-04	4.85E-04	3.06E-04	2.72E-04	2.51E-04	4.96E-04
RA-224	3.62 D	2.40E-05	2.32E-05	2.52E-05	3.38E-05	2.54E-05	2.06E-05	1.98E-05	3.45E-05
RA-225	14.8 D	1.96E-05	1.23E-05	1.37E-05	2.43E-05	5.71E-06	9.95E-06	6.67E-06	2.48E-05
RA-226	1600 Y	1.59E-05	1.55E-05	1.70E-05	2.44E-05	1.63E-05	1.35E-05	1.31E-05	2.50E-05
RA-228	5.75 Y	1.87E-17	1.51E-16	1.23E-14	7.40E-15	4.04E-15	6.10E-15	9.10E-15	2.00E-14
AC-225	10.0 D	3.12E-05	3.04E-05	3.35E-05	5.27E-05	2.82E-05	2.61E-05	2.41E-05	5.41E-05
AC-227	21.773 Y	2.71E-07	2.66E-07	2.98E-07	4.75E-07	2.51E-07	2.30E-07	2.15E-07	4.91E-07
AC-228	6.13 H	2.46E-03	2.34E-03	2.49E-03	2.73E-03	2.52E-03	2.24E-03	2.02E-03	2.78E-03
TH-226	30.9 M	1.81E-05	1.77E-05	1.95E-05	2.97E-05	1.73E-05	1.54E-05	1.44E-05	3.05E-05
TH-227	18.718 D	2.49E-04	2.40E-04	2.60E-04	3.52E-04	2.56E-04	2.14E-04	2.03E-04	3.60E-04
TH-228	1.9132 Y	4.49E-06	4.38E-06	4.82E-06	7.60E-06	4.00E-06	3.75E-06	3.43E-06	7.81E-06
TH-229	7.34E3 Y	1.99E-04	1.93E-04	2.13E-04	3.43E-04	1.73E-04	1.65E-04	1.50E-04	3.52E-04
TH-230	7.7E4 Y	8.43E-07	8.06E-07	8.97E-07	1.49E-06	6.41E-07	6.78E-07	5.86E-07	1.53E-06
TH-231	25.52 H	2.59E-05	2.42E-05	2.72E-05	4.60E-05	1.94E-05	2.06E-05	1.79E-05	4.74E-05

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
PO-216	0.146 S	5.96E-08	3.53E-08	3.60E-08	5.16E-08	4.08E-08	4.90E-08	3.17E-08	4.14E-08
PO-218	3.05 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AT-211	7.214 H	1.50E-04	7.86E-05	7.97E-05	1.37E-04	1.07E-04	1.36E-04	6.90E-05	1.04E-04
AT-217	0.0323 S	9.48E-07	5.61E-07	5.69E-07	8.25E-07	6.34E-07	7.70E-07	5.02E-07	6.59E-07
RN-218	0.035 S	3.02E-06	1.79E-06	1.81E-06	2.62E-06	2.02E-06	2.45E-06	1.60E-06	2.10E-06
RN-219	3.96 S	2.20E-04	1.32E-04	1.32E-04	1.96E-04	1.48E-04	1.85E-04	1.18E-04	1.56E-04
RN-220	55.61 S	2.07E-06	1.23E-06	1.24E-06	1.81E-06	1.38E-06	1.68E-06	1.10E-06	1.44E-06
RN-222	3.8235 D	1.53E-06	9.08E-07	9.18E-07	1.34E-06	1.01E-06	1.24E-06	8.12E-07	1.07E-06
FR-221	4.8 M	1.17E-04	7.05E-05	7.01E-05	1.07E-04	8.13E-05	1.03E-04	6.26E-05	8.38E-05
FR-223	21.8 M	1.98E-04	9.77E-05	9.93E-05	1.71E-04	1.27E-04	1.62E-04	8.49E-05	1.30E-04
RA-222	38.0 S	3.54E-05	2.13E-05	2.13E-05	3.15E-05	2.38E-05	2.96E-05	1.90E-05	2.50E-05
RA-223	11.434 D	5.19E-04	3.01E-04	3.01E-04	4.70E-04	3.60E-04	4.55E-04	2.66E-04	3.67E-04
RA-224	3.62 D	3.81E-05	2.30E-05	2.29E-05	3.44E-05	2.61E-05	3.29E-05	2.05E-05	2.72E-05
RA-225	14.8 D	4.35E-05	9.64E-06	1.06E-05	3.07E-05	1.94E-05	2.56E-05	7.76E-06	2.07E-05
RA-226	1600 Y	2.56E-05	1.54E-05	1.53E-05	2.35E-05	1.80E-05	2.28E-05	1.37E-05	1.84E-05
RA-228	5.75 Y	2.60E-12	3.51E-15	3.18E-15	1.13E-13	2.60E-18	7.79E-15	1.14E-18	1.56E-13
AC-225	10.0 D	5.43E-05	2.97E-05	2.97E-05	4.80E-05	3.68E-05	4.72E-05	2.61E-05	3.72E-05
AC-227	21.773 Y	6.40E-07	2.65E-07	2.64E-07	4.37E-07	3.24E-07	4.20E-07	2.30E-07	3.44E-07
AC-228	6.13 H	3.80E-03	2.27E-03	2.30E-03	3.30E-03	2.61E-03	3.13E-03	2.05E-03	2.65E-03
TH-226	30.9 M	3.07E-05	1.75E-05	1.74E-05	2.75E-05	2.11E-05	2.69E-05	1.53E-05	2.14E-05
TH-227	18.718 D	4.06E-04	2.36E-04	2.36E-04	3.61E-04	2.73E-04	3.43E-04	2.10E-04	2.83E-04
TH-228	1.9132 Y	8.80E-06	4.25E-06	4.26E-06	7.00E-06	5.33E-06	6.81E-06	3.74E-06	5.43E-06
TH-229	7.34E3 Y	3.43E-04	1.88E-04	1.88E-04	3.09E-04	2.37E-04	3.04E-04	1.64E-04	2.38E-04
TH-230	7.7E4 Y	2.66E-06	7.56E-07	7.68E-07	1.42E-06	1.03E-06	1.32E-06	6.60E-07	1.11E-06
TH-231	25.52 H	6.17E-05	2.31E-05	2.34E-05	4.34E-05	3.08E-05	4.06E-05	1.98E-05	3.30E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
TH-232	1.405E10 Y	3.36E-07	3.43E-07	3.33E-07	1.34E-06	3.00E-07	2.69E-07	3.25E-07	2.96E-07
TH-233	22.3 M	8.38E-05	7.99E-05	8.79E-05	1.15E-04	7.77E-05	6.96E-05	8.27E-05	7.61E-05
TH-234	24.10 D	1.70E-05	1.74E-05	1.76E-05	3.49E-05	1.60E-05	1.40E-05	1.72E-05	1.53E-05
PA-230	17.4 D	1.70E-03	1.64E-03	1.83E-03	2.18E-03	1.62E-03	1.46E-03	1.72E-03	1.58E-03
PA-231	3.276E4 Y	7.45E-05	6.91E-05	7.42E-05	1.12E-04	6.68E-05	5.98E-05	7.13E-05	6.63E-05
PA-233	27.0 D	5.32E-04	4.96E-04	5.37E-04	7.59E-04	4.82E-04	4.30E-04	5.12E-04	4.75E-04
PA-234	6.70 H	5.08E-03	4.93E-03	5.51E-03	6.42E-03	4.86E-03	4.40E-03	5.17E-03	4.76E-03
PA-234M	1.17 M	2.99E-05	2.91E-05	3.26E-05	3.71E-05	2.87E-05	2.60E-05	3.06E-05	2.81E-05
U-230	20.8 D	2.49E-06	2.40E-06	2.50E-06	5.31E-06	2.26E-06	2.01E-06	2.40E-06	2.22E-06
U-231	4.2 D	1.57E-04	1.53E-04	1.59E-04	3.00E-04	1.46E-04	1.27E-04	1.58E-04	1.41E-04
U-232	72 Y	4.83E-07	4.68E-07	4.66E-07	1.97E-06	4.24E-07	3.76E-07	4.55E-07	4.22E-07
U-233	1.592E5 Y	5.28E-07	4.90E-07	5.21E-07	1.23E-06	4.81E-07	4.14E-07	5.17E-07	4.69E-07
U-234	2.445E5 Y	2.37E-07	2.25E-07	2.19E-07	1.38E-06	2.00E-07	1.77E-07	2.16E-07	2.04E-07
U-235	7.038E8 Y	3.80E-04	3.48E-04	3.72E-04	5.76E-04	3.41E-04	3.01E-04	3.62E-04	3.37E-04
U-236	2.3415E7 Y	1.69E-07	1.63E-07	1.60E-07	1.21E-06	1.44E-07	1.27E-07	1.51E-07	1.45E-07
U-237	6.75 D	3.16E-04	3.04E-04	3.16E-04	5.48E-04	2.88E-04	2.54E-04	3.09E-04	2.82E-04
U-238	4.468E9 Y	1.41E-07	1.36E-07	1.33E-07	1.06E-06	1.20E-07	1.06E-07	1.25E-07	1.21E-07
U-239	23.40 M	1.03E-04	1.08E-04	1.10E-04	1.99E-04	9.79E-05	8.76E-05	1.05E-04	9.39E-05
U-240	14.1 H	8.80E-07	1.04E-06	7.02E-07	7.10E-06	6.43E-07	6.52E-07	8.29E-07	7.33E-07
NP-235	396.1 D	4.25E-06	4.01E-06	4.21E-06	1.12E-05	3.87E-06	3.34E-06	4.17E-06	3.78E-06
NP-236	1.15E6 Y	3.10E-04	2.93E-04	3.09E-04	5.39E-04	2.84E-04	2.47E-04	3.05E-04	2.77E-04
NP-236M	22.5 H	1.21E-04	1.17E-04	1.24E-04	2.05E-04	1.13E-04	9.85E-05	1.21E-04	1.09E-04
NP-237	2.14E6 Y	5.08E-05	5.03E-05	5.11E-05	1.05E-04	4.67E-05	4.10E-05	5.09E-05	4.54E-05
NP-238	2.117 D	1.45E-03	1.42E-03	1.59E-03	1.78E-03	1.40E-03	1.27E-03	1.49E-03	1.37E-03
NP-239	2.355 D	4.09E-04	3.82E-04	4.07E-04	6.43E-04	3.71E-04	3.26E-04	3.96E-04	3.64E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
TH-232	1.405E10 Y	3.62E-07	3.37E-07	3.84E-07	6.48E-07	2.50E-07	2.85E-07	2.40E-07	6.74E-07
TH-233	22.3 M	8.29E-05	7.94E-05	8.57E-05	1.06E-04	8.42E-05	7.47E-05	6.72E-05	1.08E-04
TH-234	24.10 D	1.79E-05	1.72E-05	1.91E-05	3.27E-05	1.34E-05	1.44E-05	1.24E-05	3.36E-05
PA-230	17.4 D	1.71E-03	1.63E-03	1.75E-03	2.00E-03	1.74E-03	1.56E-03	1.40E-03	2.03E-03
PA-231	3.276E4 Y	7.19E-05	6.85E-05	7.46E-05	9.82E-05	7.43E-05	6.22E-05	5.85E-05	1.00E-04
PA-233	27.0 D	5.10E-04	4.93E-04	5.36E-04	7.13E-04	5.28E-04	4.47E-04	4.18E-04	7.28E-04
PA-234	6.70 H	5.15E-03	4.90E-03	5.24E-03	5.85E-03	5.27E-03	4.69E-03	4.22E-03	5.96E-03
PA-234M	1.17 M	3.04E-05	2.89E-05	3.08E-05	3.37E-05	3.10E-05	2.79E-05	2.49E-05	3.43E-05
U-230	20.8 D	2.47E-06	2.39E-06	2.64E-06	4.08E-06	2.20E-06	2.05E-06	1.87E-06	4.20E-06
U-231	4.2 D	1.57E-04	1.52E-04	1.69E-04	2.80E-04	1.31E-04	1.30E-04	1.17E-04	2.89E-04
U-232	72 Y	4.91E-07	4.62E-07	5.32E-07	8.62E-07	3.81E-07	3.99E-07	3.51E-07	9.01E-07
U-233	1.592E5 Y	4.98E-07	4.89E-07	5.49E-07	8.77E-07	4.60E-07	4.24E-07	3.97E-07	9.08E-07
U-234	2.445E5 Y	2.40E-07	2.21E-07	2.65E-07	4.32E-07	1.75E-07	1.95E-07	1.69E-07	4.57E-07
U-235	7.038E8 Y	3.56E-04	3.47E-04	3.80E-04	5.51E-04	3.65E-04	3.03E-04	2.93E-04	5.64E-04
U-236	2.3415E7 Y	1.70E-07	1.61E-07	1.96E-07	3.31E-07	1.12E-07	1.41E-07	1.17E-07	3.53E-07
U-237	6.75 D	3.13E-04	3.01E-04	3.32E-04	5.13E-04	2.83E-04	2.60E-04	2.39E-04	5.27E-04
U-238	4.468E9 Y	1.43E-07	1.35E-07	1.65E-07	2.79E-07	9.26E-08	1.18E-07	9.79E-08	2.98E-07
U-239	23.40 M	1.12E-04	1.07E-04	1.17E-04	1.87E-04	8.45E-05	9.13E-05	7.69E-05	1.92E-04
U-240	14.1 H	1.28E-06	9.06E-07	1.11E-06	1.91E-06	4.78E-07	7.86E-07	5.73E-07	2.02E-06
NP-235	396.1 D	4.09E-06	4.00E-06	4.53E-06	7.42E-06	3.53E-06	3.45E-06	3.15E-06	7.70E-06
NP-236	1.15E6 Y	2.98E-04	2.92E-04	3.23E-04	5.12E-04	2.74E-04	2.51E-04	2.34E-04	5.26E-04
NP-236M	22.5 H	1.19E-04	1.16E-04	1.28E-04	1.95E-04	1.08E-04	1.02E-04	9.24E-05	2.01E-04
NP-237	2.14E6 Y	5.26E-05	4.96E-05	5.53E-05	9.14E-05	4.19E-05	4.22E-05	3.75E-05	9.41E-05
NP-238	2.117 D	1.49E-03	1.41E-03	1.50E-03	1.60E-03	1.52E-03	1.36E-03	1.22E-03	1.63E-03
NP-239	2.355 D	3.91E-04	3.80E-04	4.17E-04	6.10E-04	3.84E-04	3.34E-04	3.14E-04	6.26E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
TH-232	1.405E10 Y	1.85E-06	3.13E-07	3.20E-07	6.72E-07	4.40E-07	5.76E-07	2.67E-07	5.36E-07
TH-233	22.3 M	1.35E-04	7.74E-05	7.82E-05	1.17E-04	8.90E-05	1.10E-04	6.90E-05	9.27E-05
TH-234	24.10 D	3.25E-05	1.63E-05	1.65E-05	2.88E-05	2.21E-05	2.84E-05	1.42E-05	2.13E-05
PA-230	17.4 D	2.69E-03	1.58E-03	1.61E-03	2.34E-03	1.85E-03	2.23E-03	1.42E-03	1.87E-03
PA-231	3.276E4 Y	1.25E-04	6.77E-05	6.76E-05	1.04E-04	7.71E-05	9.73E-05	6.00E-05	8.21E-05
PA-233	27.0 D	8.25E-04	4.87E-04	4.86E-04	7.36E-04	5.57E-04	6.98E-04	4.32E-04	5.80E-04
PA-234	6.70 H	8.01E-03	4.76E-03	4.84E-03	6.97E-03	5.50E-03	6.62E-03	4.29E-03	5.59F-03
PA-234M	1.17 M	4.72E-05	2.80E-05	2.85E-05	4.09E-05	3.26E-05	3.91E-05	2.52E-05	3.29E-05
U-230	20.8 D	6.04E-06	2.31E-06	2.32E-06	3.93E-06	2.90E-06	3.70E-06	2.03E-06	3.08E-06
U-231	4.2 D	2.84E-04	1.48E-04	1.48E-04	2.49E-04	1.89E-04	2.45E-04	1.28E-04	1.91E-04
U-232	72 Y	2.77E-06	4.41E-07	4.47E-07	9.44E-07	5.87E-07	7.77E-07	3.75E-07	7.66E-07
U-233	1.592E5 Y	1.45E-06	4.87E-07	4.85E-07	8.26E-07	5.95E-07	7.75E-07	4.22E-07	6.57E-07
U-234	2.445E5 Y	2.11E-06	2.12E-07	2.16E-07	5.33E-07	2.86E-07	3.91E-07	1.75E-07	4.46E-07
U-235	7.038E8 Y	5.76E-04	3.46E-04	3.43E-04	5.26E-04	4.03E-04	5.12E-04	3.06E-04	4.13E-04
U-236	2.3415E7 Y	1.90E-06	1.52E-07	1.56E-07	4.17E-07	2.14E-07	2.92E-07	1.26E-07	3.56E-07
U-237	6.75 D	5.34E-04	2.93E-04	2.94E-04	4.79E-04	3.65E-04	4.66E-04	2.57E-04	3.70E-04
U-238	4.468E9 Y	1.67E-06	1.26E-07	1.30E-07	3.58E-07	1.80E-07	2.47E-07	1.05E-07	3.06E-07
U-239	23.40 M	1.93E-04	9.92E-05	1.01E-04	1.74E-04	1.35E-04	1.70E-04	8.74E-05	1.32E-04
U-240	14.1 H	1.04E-05	7.69E-07	8.29E-07	2.85E-06	1.36E-06	1.91E-06	5.98E-07	2.23E-06
NP-235	396.1 D	1.34E-05	3.94E-06	3.94E-06	7.08E-06	4.95E-06	6.50E-06	3.39E-06	5.61E-06
NP-236	1.15E6 Y	5.16E-04	2.88E-04	2.87E-04	4.61E-04	3.54E-04	4.55E-04	2.51E-04	3.58E-04
NP-236M	22.5 H	2.02E-04	1.13E-04	1.14E-04	1.82E-04	1.40E-04	1.79E-04	9.91E-05	1.41E-04
NP-237	2.14E6 Y	1.04E-04	4.77E-05	4.81E-05	8.44E-05	6.23E-05	8.12E-05	4.13E-05	6.42E-05
NP-238	2.117 D	2.29E-03	..36E-03	1.39E-03	1.98E-03	1.59E-03	1.89E-03	1.23E-03	1.60E-03
NP-239	2.355 D	6.46E-04	3.76E-04	3.74E-04	5.84E-04	4.45E-04	5.66E-04	3.31E-04	4.56E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
NP-240	65 M	2.98E-03	2.86E-03	3.20E-03	3.77E-03	2.82E-03	2.55E-03	3.00E-03	2.76E-03
NP-240M	7.4 M	8.45E-04	8.13E-04	9.10E-04	1.06E-03	7.99E-04	7.24E-04	8.49E-04	7.83E-04
PU-236	2.851 Y	1.21E-07	1.00E-07	9.67E-08	1.50E-06	8.81E-08	7.62E-08	8.95E-08	9.69E-08
PU-237	45.3 D	1.11E-04	1.07E-04	1.12E-04	2.06E-04	1.03E-04	8.88E-05	1.11E-04	9.93E-05
PU-238	87.75 Y	7.03E-08	4.80E-08	4.58E-08	1.25E-06	4.27E-08	3.56E-08	4.18E-08	5.25E-08
PU-239	24131 Y	1.45E-07	1.26E-07	1.35E-07	6.64E-07	1.25E-07	1.07E-07	1.33E-07	1.26E-07
PU-240	6537 Y	7.14E-08	5.13E-08	4.80E-08	1.20E-06	4.46E-08	3.77E-08	4.44E-08	5.39E-08
PU-241	14.4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PU-242	3.758E5 Y	6.33E-08	4.68E-08	4.45E-08	1.00E-06	4.11E-08	3.49E-08	4.10E-08	4.85E-08
PU-243	4.956 H	5.24E-05	5.28E-05	5.44E-05	1.00E-04	4.92E-05	4.33E-05	5.27E-05	4.72E-05
PU-244	8.26E7 Y	3.32E-08	1.78E-08	1.42E-08	8.25E-07	1.43E-08	1.14E-08	1.42E-08	2.22E-08
PU-245	10.57 H	1.07E-03	1.02E-03	1.13E-03	1.39E-03	1.00E-03	9.00E-04	1.06E-03	9.81E-04
PU-246	10.85 D	2.34E-04	2.20E-04	2.28E-04	3.65E-04	2.07E-04	1.87E-04	2.23E-04	2.07E-04
AM-241	432.2 Y	3.70E-05	4.24E-05	3.88E-05	9.75E-05	3.43E-05	3.18E-05	3.78E-05	3.33E-05
AM-242	16.02 H	3.19E-05	3.03E-05	3.19E-05	6.01E-05	2.94E-05	2.54E-05	3.18E-05	2.85E-05
AM-242M	152 Y	6.76E-07	5.74E-07	5.81E-07	4.72E-06	5.39E-07	4.61E-07	5.71E-07	5.68E-07
AM-243	7.38E3 Y	1.09E-04	1.16E-04	1.15E-04	2.36E-04	1.03E-04	9.19E-05	1.10E-04	9.82E-05
AM-244	10.1 H	2.08E-03	2.00E-03	2.24E-03	2.60E-03	1.97E-03	1.78E-03	2.10E-03	1.93E-03
AM-245	122.4 M	7.69E-05	7.14E-05	7.63E-05	1.19E-04	6.96E-05	6.13E-05	7.43E-05	6.84E-05
AM-246	25.0 M	2.55E-03	2.49E-03	2.81E-03	3.14E-03	2.46E-03	2.24E-03	2.62E-03	2.41E-03
CM-242	163.2 D	7.68E-08	4.48E-08	4.60E-08	1.39E-06	4.36E-08	3.45E-08	3.99E-08	5.61E-08
CM-243	28.5 Y	3.11E-04	2.90E-04	3.09E-04	4.85E-04	2.81E-04	2.48E-04	3.01E-04	2.77E-04
CM-244	18.11 Y	5.99E-08	3.05E-08	3.18E-08	1.22E-06	3.07E-08	2.33E-08	2.68E-08	4.23E-08
CM-245	8.5E3 Y	1.68E-04	1.59E-04	1.68E-04	2.93E-04	1.54E-04	1.34E-04	1.66E-04	1.50E-04
CM-246	4.75E3 Y	4.33E-08	1.79E-08	1.61E-08	1.07E-06	1.67E-08	1.20E-08	1.44E-08	2.83E-08

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
NP-240	65 M	2.99E-03	2.85E-03	3.05E-03	3.44E-03	3.07E-03	2.73E-03	2.45E-03	3.51E-03
NP-240M	7.4 M	8.48E-04	8.09E-04	8.65E-04	9.65E-04	8.80E-04	7.77E-04	6.98E-04	9.80E-04
PU-236	2.851 Y	1.08E-07	9.95E-08	1.40E-07	2.25E-07	7.01E-08	9.60E-08	8.14E-08	2.51E-07
PU-237	45.3 D	1.09E-04	1.06E-04	1.18E-04	1.95E-04	9.36E-05	9.08E-05	8.26E-05	2.01E-04
PU-238	87.75 Y	5.37E-08	4.78E-08	7.96E-08	1.20E-07	3.58E-08	5.24E-08	4.60E-08	1.41E-07
PU-239	24131 Y	1.29E-07	1.27E-07	1.50E-07	2.36E-07	1.21E-07	1.14E-07	1.08E-07	2.49E-07
PU-240	6537 Y	5.77E-08	5.08E-08	8.17E-08	1.25E-07	3.67E-08	5.41E-08	4.68E-08	1.45E-07
PU-241	14.4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PU-242	3.758E5 Y	5.19E-08	4.65E-08	7.25E-08	1.12E-07	3.36E-08	4.84E-08	4.18E-08	1.29E-07
PU-243	4.956 H	5.41E-05	5.25E-05	5.79E-05	9.58E-05	4.29E-05	4.45E-05	3.87E-05	9.85E-05
PU-244	8.26E7 Y	2.24E-08	1.65E-08	3.63E-08	4.94E-08	1.40E-08	2.26E-08	2.09E-08	6.27E-08
PU-245	10.57 H	1.06E-03	1.01E-03	1.09E-03	1.28E-03	1.10E-03	9.61E-04	8.70E-04	1.30E-03
PU-246	10.85 D	2.30E-04	2.16E-04	2.36E-04	3.32E-04	2.26E-04	1.90E-04	1.80E-04	3.39E-04
AM-241	432.2 Y	4.57E-05	4.12E-05	4.58E-05	8.22E-05	2.47E-05	3.35E-05	2.57E-05	8.44E-05
AM-242	16.02 H	3.09E-05	3.02E-05	3.37E-05	5.50E-05	2.73E-05	2.59E-05	2.39E-05	5.67E-05
AM-242M	152 Y	6.11E-07	5.71E-07	7.34E-07	1.16E-06	4.94E-07	5.35E-07	4.82E-07	1.25E-06
AM-243	7.38E3 Y	1.20E-04	1.15E-04	1.26E-04	2.21E-04	8.11E-05	9.44E-05	7.80E-05	2.27E-04
AM-244	10.1 H	2.09E-03	1.99E-03	2.13E-03	2.36E-03	2.15E-03	1.92E-03	1.71E-03	2.41E-03
AM-245	122.4 M	7.31E-05	7.11E-05	7.79E-05	1.13E-04	7.30E-05	6.26E-05	5.93E-05	1.16E-04
AM-246	25.0 M	2.61E-03	2.48E-03	2.64E-03	2.83E-03	2.67E-03	2.39E-03	2.14E-03	2.88E-03
CM-242	163.2 D	5.03E-08	4.64E-08	8.53E-08	1.25E-07	3.85E-08	5.54E-08	5.01E-08	1.50E-07
CM-243	28.5 Y	2.97E-04	2.88E-04	3.16E-04	4.58E-04	2.95E-04	2.54E-04	2.40E-04	4.70E-04
CM-244	18.11 Y	3.51E-08	3.20E-08	6.59E-08	9.35E-08	2.83E-08	4.19E-08	3.87E-08	1.15E-07
CM-245	8.5E3 Y	1.62E-04	1.58E-04	1.75E-04	2.79E-04	1.49E-04	1.36E-04	1.27E-04	2.87E-04
CM-246	4.75E3 Y	2.33E-08	1.78E-08	4.67E-08	6.17E-08	1.76E-08	2.85E-08	2.71E-08	7.99E-08

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
NP-240	65 M	4.68E-03	2.77E-03	2.81E-03	4.07E-03	3.19E-03	3.86E-03	2.49E-03	3.26E-03
NP-240M	7.4 M	1.33E-03	7.87E-04	7.90E-04	1.15E-03	8.94E-04	1.08E-03	7.08E-04	9.24E-04
PU-236	2.851 Y	2.47E-06	9.79E-08	1.01E-07	4.04E-07	1.33E-07	2.07E-07	7.38E-08	3.63E-07
PU-237	45.3 D	1.93E-04	1.04E-04	1.04E-04	1.72E-04	1.32E-04	1.71E-04	9.02E-05	1.33E-04
PU-238	87.75 Y	2.12E-06	5.05E-08	5.26E-08	2.90E-07	6.44E-08	1.15E-07	3.34E-08	2.72E-07
PU-239	24131 Y	9.81E-07	1.29E-07	1.28E-07	2.76E-07	1.54E-07	2.10E-07	1.09E-07	2.34E-07
PU-240	6537 Y	2.03E-06	5.24E-08	5.48E-08	2.87E-07	6.88E-08	1.20E-07	3.53E-08	2.66E-07
PU-241	14.4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PU-242	3.758E5 Y	1.69E-06	4.76E-08	4.95E-08	2.45E-07	6.27E-08	1.06E-07	3.30E-08	2.26E-07
PU-243	4.956 H	9.40E-05	4.99E-05	5.04E-05	8.53E-05	6.60E-05	8.42E-05	4.38E-05	6.50E-05
PU-244	8.26E7 Y	1.43E-06	1.96E-08	2.08E-08	1.73E-07	2.34E-08	5.24E-08	1.02E-08	1.67E-07
PU-245	10.57 H	1.67E-03	9.90E-04	1.00E-03	1.46E-03	1.13E-03	1.38E-03	8.85E-04	1.17E-03
PU-246	10.85 D	3.77E-04	2.12E-04	2.12E-04	3.36E-04	2.52E-04	3.20E-04	1.88E-04	2.61E-04
AM-241	432.2 Y	9.36E-05	3.62E-05	3.77E-05	7.62E-05	5.64E-05	7.27E-05	3.08E-05	5.57E-05
AM-242	16.02 H	5.80E-05	2.98E-05	2.97E-05	4.91E-05	3.72E-05	4.82E-05	2.58E-05	3.80E-05
AM-242M	152 Y	7.12E-06	5.77E-07	5.85E-07	1.70E-06	7.20E-07	1.07E-06	4.57E-07	1.43E-06
AM-243	7.38E3 Y	2.17E-04	1.05E-04	1.08E-04	1.94E-04	1.50E-04	1.92E-04	9.23E-05	1.45E-04
AM-244	10.1 H	3.28E-03	1.93E-03	1.97E-03	2.83E-03	2.23E-03	2.69E-03	1.73E-03	2.27E-03
AM-245	122.4 M	1.20E-04	7.05E-05	7.02E-05	1.09E-04	8.28E-05	1.05E-04	6.22E-05	8.51E-05
AM-246	25.0 M	4.03E-03	2.40E-03	2.44E-03	3.49E-03	2.78E-03	3.32E-03	2.17E-03	2.81E-03
CM-242	163.2 D	2.31E-06	5.27E-08	5.48E-08	3.35E-07	6.02E-08	1.23E-07	3.25E-08	3.08E-07
CM-243	28.5 Y	4.92E-04	2.85E-04	2.84E-04	4.41E-04	3.36E-04	4.27E-04	2.51E-04	3.46E-04
CM-244	18.11 Y	2.04E-06	3.86E-08	4.03E-08	2.84E-07	4.12E-08	9.37E-08	2.16E-08	2.64E-07
CM-245	8.5E3 Y	2.79E-04	1.56E-04	1.56E-04	2.51E-04	1.92E-04	2.47E-04	1.36E-04	1.94E-04
CM-246	4.75E3 Y	1.81E-06	2.42E-08	2.56E-08	2.38E-07	2.39E-08	6.72E-08	1.04E-08	2.23E-07

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
CM-247	1.56E7 Y	8.01E-04	7.48E-04	8.25E-04	1.04E-03	7.30E-04	6.56E-04	7.74E-04	7.20E-04
CM-248	3.39E5 Y	4.74E-08	2.76E-08	2.77E-08	8.75E-07	2.63E-08	2.08E-08	2.42E-08	3.44E-08
CM-249	64.15 M	4.80E-05	4.57E-05	5.10E-05	6.03E-05	4.48E-05	4.03E-05	4.76E-05	4.39E-05
CM-250	6.9E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-249	320 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-250	3.222 H	2.33E-03	2.28E-03	2.56E-03	2.85E-03	2.25E-03	2.05E-03	2.40E-03	2.20E-03
BK-251	57.0 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CF-248	333.5 D	3.97E-08	9.60E-09	1.09E-08	1.02E-06	1.23E-08	6.86E-09	7.68E-09	2.49E-08
CF-249	350.6 Y	8.30E-04	7.73E-04	8.50E-04	1.09E-03	7.55E-04	6.77E-04	7.99E-04	7.44E-04
CF-250	13.08 Y	8.46E-08	5.50E-08	6.00E-08	1.09E-06	5.63E-08	4.50E-08	5.31E-08	6.58E-08
CF-251	9.0E2 Y	2.85E-04	2.65E-04	2.82E-04	4.61E-04	2.59E-04	2.26E-04	2.77E-04	2.53E-04
CF-252	2.639 Y	6.62E-08	3.95E-08	4.27E-08	1.00E-06	4.04E-08	3.17E-08	3.67E-08	4.99E-08
CF-253	17.81 D	6.92E-10	1.56E-10	2.25E-10	1.73E-08	2.43E-10	1.35E-10	1.42E-10	4.43E-10
CF-254	60.5 D	2.10E-11	2.95E-11	1.86E-11	7.52E-11	1.69E-11	1.80E-11	2.32E-11	1.84E-11
ES-253	20.467 D	7.66E-07	6.79E-07	7.28E-07	1.69E-06	6.66E-07	5.91E-07	7.01E-07	6.71E-07
ES-254	275.7 D	6.51E-06	6.06E-06	6.21E-06	2.40E-05	5.61E-06	5.00E-06	5.91E-06	5.67E-06
ES-254M	39.3 H	1.44E-03	1.38E-03	1.54E-03	1.78E-03	1.35E-03	1.22E-03	1.44E-03	1.32E-03
ES-255	39.8 D	3.26E-09	9.41E-10	9.73E-10	7.79E-08	1.08E-09	6.57E-10	7.49E-10	2.10E-09
FM-254	3.240 H	1.29E-07	8.97E-08	9.83E-08	1.28E-06	9.22E-08	7.46E-08	8.96E-08	1.04E-07
FM-255	20.07 H	3.71E-06	3.55E-06	3.57E-06	1.57E-05	3.24E-06	2.84E-06	3.43E-06	3.24E-06
FM-256	157.6 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
CM-247	1.56E7 Y	7.74E-04	7.44E-04	8.02E-04	9.71E-04	8.25E-04	6.98E-04	6.42E-04	9.87E-04
CM-248	3.39E5 Y	3.14E-08	2.84E-08	5.29E-08	7.76E-08	2.32E-08	3.42E-08	3.07E-08	9.28E-08
CM-249	64.15 M	4.75E-05	4.54E-05	4.87E-05	5.56E-05	4.97E-05	4.37E-05	3.91E-05	5.65E-05
CM-250	6.9E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-249	320 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-250	3.222 H	2.39E-03	2.26E-03	2.41E-03	2.57E-03	2.44E-03	2.19E-03	1.96E-03	2.62E-03
BK-251	57.0 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CF-248	333.5 D	1.47E-08	1.12E-08	4.20E-08	5.23E-08	1.50E-08	2.48E-08	2.46E-08	7.04E-08
CF-249	350.6 Y	7.99E-04	7.69E-04	8.30E-04	1.02E-03	8.52E-04	7.17E-04	6.63E-04	1.04E-03
CF-250	13.08 Y	5.93E-08	5.76E-08	9.27E-08	1.41E-07	5.03E-08	6.31E-08	5.74E-08	1.61E-07
CF-251	9.0E2 Y	2.70E-04	2.64E-04	2.91E-04	4.39E-04	2.63E-04	2.30E-04	2.17E-04	4.51E-04
CF-252	2.639 Y	4.38E-08	4.17E-08	7.33E-08	1.09E-07	3.59E-08	4.86E-08	4.40E-08	1.28E-07
CF-253	17.81 D	2.15E-10	2.04E-10	7.27E-10	9.14E-10	2.80E-10	4.33E-10	4.35E-10	1.22E-09
CF-254	60.5 D	3.65E-11	2.50E-11	2.76E-11	4.96E-11	1.20E-11	2.01E-11	1.37E-11	5.06E-11
ES-253	20.467 D	7.01E-07	6.79E-07	7.58E-07	1.04E-06	7.43E-07	6.06E-07	5.91E-07	1.08E-06
ES-254	275.7 D	6.39E-06	6.03E-06	7.00E-06	1.05E-05	5.50E-06	5.40E-06	4.83E-06	1.10E-05
ES-254M	39.3 H	1.43E-03	1.37E-03	1.46E-03	1.63E-03	1.49E-03	1.33E-03	1.18E-03	1.66E-03
ES-255	39.8 D	1.44E-09	1.05E-09	3.51E-09	4.51E-09	1.26E-09	2.11E-09	2.02E-09	5.91E-09
FM-254	3.240 H	9.69E-08	9.38E-08	1.40E-07	2.17E-07	8.36E-08	9.81E-08	8.92E-08	2.42E-07
FM-255	20.07 H	3.74E-06	3.54E-06	4.20E-06	7.02E-06	2.72E-06	3.09E-06	2.64E-06	7.36E-06
FM-256	157.6 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
CM-247	1.56E7 Y	1.23E-03	7.32E-04	7.35E-04	1.08E-03	8.15E-04	1.01E-03	6.54E-04	8.60E-04
CM-248	3.39E5 Y	1.45E-06	3.22E-08	3.36E-08	2.11E-07	3.72E-08	7.66E-08	1.94E-08	1.94E-07
CM-249	64.15 M	7.49E-05	4.43E-05	4.49E-05	6.52E-05	5.01E-05	6.11E-05	3.96E-05	5.21E-05
CM-250	6.9E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-249	320 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-250	3.222 H	3.68E-03	2.19E-03	2.23E-03	3.18E-03	2.55E-03	3.04E-03	1.98E-03	2.56E-03
BK-251	57.0 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CF-248	333.5 D	1.69E-06	1.99E-08	2.12E-08	2.38E-07	1.31E-08	6.04E-08	5.26E-09	2.18E-07
CF-249	350.6 Y	1.27E-03	7.58E-04	7.60E-04	1.12E-03	8.45E-04	1.05E-03	6.77E-04	8.91E-04
CF-250	13.08 Y	1.74E-06	6.38E-08	6.54E-08	3.07E-07	7.18E-08	1.34E-07	4.43E-08	2.70E-07
CF-251	9.0E2 Y	4.52E-04	2.62E-04	2.61E-04	4.09E-04	3.13E-04	4.00E-04	2.30E-04	3.19E-04
CF-252	2.639 Y	1.61E-06	4.75E-08	4.91E-08	2.69E-07	5.25E-08	1.07E-07	3.06E-08	2.38E-07
CF-253	17.81 D	2.85E-08	3.61E-10	3.78E-10	3.98E-09	2.19E-10	1.01E-09	1.13E-10	3.67E-09
CF-254	60.5 D	7.40E-11	2.00E-11	2.17E-11	5.73E-11	3.83E-11	4.99E-11	1.65E-11	3.92E-11
ES-253	20.467 D	2.11E-06	6.83E-07	6.78E-07	1.15E-06	7.72E-07	1.00E-06	5.99E-07	9.24E-07
ES-254	275.7 D	3.24E-05	5.85E-06	5.93E-06	1.26E-05	7.34E-06	9.90E-06	4.98E-06	1.01E-05
ES-254M	39.3 H	2.26E-03	1.33E-03	1.35E-03	1.95E-03	1.52E-03	1.84E-03	1.19E-03	1.56E-03
ES-255	39.8 D	1.27E-07	1.72E-09	1.84E-09	1.91E-08	1.28E-09	5.22E-09	5.07E-10	1.71E-08
FM-254	3.240 H	1.95E-06	1.02E-07	1.04E-07	4.13E-07	1.15E-07	2.06E-07	7.38E-08	3.50E-07
FM-255	20.07 H	2.05E-05	3.39E-06	3.46E-06	8.01E-06	4.55E-06	6.29E-06	2.82E-06	6.30E-06
FM-256	157.6 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
H-3	12.28 Y	0.0	0.0	0.0	0.0	0.0
BE-7	53.44 D	0.0	0.0	0.0	0.0	0.0
BE-10	1.6E6 Y	3.37E-04	1.19E-05	5.65E-08	6.41E-05	3.01E-04
C-11	20.48 M	7.83E-04	1.85E-04	3.76E-05	2.60E-04	7.43E-04
C-14	5.73E3 Y	1.33E-05	0.0	0.0	1.15E-06	6.17E-06
N-13	9.97 M	1.04E-03	3.57E-04	1.18E-04	4.31E-04	1.00E-03
N-16	7.13 S	6.58E-03	5.55E-03	4.74E-03	5.59E-03	6.55E-03
O-15	122.24 S	1.63E-03	8.35E-04	4.35E-04	9.01E-04	1.59E-03
F-18	109.74 M	4.40E-04	3.07E-05	7.33E-07	9.40E-05	4.02E-04
NA-22	2.602 Y	3.35E-04	1.23E-05	8.85E-07	6.43E-05	3.00E-04
NA-24	15.00 H	1.18E-03	4.83E-04	1.98E-04	5.53E-04	1.15E-03
MG-27	9.458 M	1.54E-03	7.76E-04	4.00E-04	8.41E-04	1.51E-03
MG-28	20.91 H	2.21E-04	2.12E-06	3.29E-08	3.83E-05	1.90E-04
AL-26	7.2E5 Y	8.45E-04	2.84E-04	9.08E-05	3.45E-04	8.13E-04
AL-28	2.240 M	2.87E-03	1.97E-03	1.38E-03	2.02E-03	2.84E-03
SI-31	157.3 M	1.29E-03	5.6[illegible]E-04	2.52E-04	6.33E-04	1.25E-03
SI-32	3.3E2 Y	3.68E-05	0.0	0.0	5.72E-06	2.32E-05
P-32	14.29 D	1.53E-03	7.64E-04	3.91E-04	8.29E-04	1.49E-03
P-33	25.4 D	5.81E-05	0.0	0.0	1.18E-05	4.05E-05
S-35	87.44 D	1.55E-05	0.0	0.0	1.54E-06	7.91E-06
CL-36	3.01E5 Y	4.53E-04	4.57E-05	2.57E-06	1.06E-04	4.16E-04
CL-38	37.21 M	3.63E-03	2.75E-03	2.20E-03	2.81E-03	3.60E-03
AR-37	35.02 D	0.0	0.0	0.0	0.0	0.0
AR-39	269 Y	3.83E-04	1.92E-05	1.42E-07	7.66E-05	3.47E-04
AR-41	1.827 H	9.69E-04	3.30E-04	1.12E-04	4.00E-04	9.31E-04
K-40	1.277E9 Y	9.61E-04	3.63E-04	1.37E-04	4.25E-04	9.28E-04
K-42	12.36 H	3.35E-03	2.43E-03	1.82E-03	2.48E-03	3.32E-03
K-43	22.6 H	5.87E-04	1.08E-04	2.10E-05	1.73E-04	5.50E-04
CA-41	1.03E5 Y	0.0	0.0	0.0	0.0	0.0
CA-45	162.7 D	6.01E-05	0.0	0.0	1.29E-05	4.24E-05
CA-47	4.536 D	6.82E-04	2.16E-04	1.07E-04	2.76E-04	6.47E-04
CA-49	8.719 M	1.96E-03	1.15E-03	6.98E-04	1.21E-03	1.92E-03
SC-44	3.927 H	1.31E-03	5.83E-04	2.59E-04	6.50E-04	1.27E-03
SC-46	83.80 D	1.32E-04	5.52E-08	8.58E-09	2.20E-05	1.06E-04
SC-46M	18.72 S	6.96E-05	0.0	0.0	4.97E-06	4.96E-05
SC-47	3.422 D	2.48E-04	6.35E-06	7.49E-08	4.55E-05	2.16E-04
SC-48	43.67 H	3.82E-04	2.72E-05	8.60E-07	8.20E-05	3.47E-04
SC-49	57.4 M	1.84E-03	1.04E-03	6.00E-04	1.10E-03	1.80E-03
TI-44	47.3 Y	3.48E-07	0.0	0.0	4.52E-09	8.36E-09
TI-45	3.08 H	7.76E-04	2.18E-04	5.47E-05	2.84E-04	7.43E-04
TI-51	5.752 M	1.94E-03	1.13E-03	6.77E-04	1.19E-03	1.91E-03
V-48	15.971 D	2.79E-04	2.92E-05	1.50E-06	6.62E-05	2.59E-04
V-49	330 D	0.0	0.0	0.0	0.0	0.0
V-52	3.75 M	2.44E-03	1.58E-03	1.05E-03	1.63E-03	2.41E-03
CR-49	42.09 M	1.30E-03	5.88E-04	2.66E-04	6.53E-04	1.27E-03
CR-51	27.704 D	0.0	0.0	0.0	0.0	0.0
MN-52	5.591 D	1.28E-04	5.97E-06	4.86E-08	2.53E-05	1.16E-04
MN-52M	21.4 M	2.60E-03	1.73E-03	1.18E-03	1.79E-03	2.57E-03
MN-53	3.7E6 Y	0.0	0.0	0.0	0.0	0.0

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
MN-54	312.7 D	0.0	0.0	0.0	0.0	0.0
MN-56	2.5785 H	1.86E-03	1.14E-03	7.67E-04	1.20E-03	1.83E-03
MN-57	1.47 M	2.52E-03	1.65E-03	1.12E-03	1.71E-03	2.49E-03
FE-52	8.275 H	3.87E-04	6.12E-05	6.79E-06	1.06E-04	3.62E-04
FE-55	2.7 Y	0.0	0.0	0.0	0.0	0.0
FE-59	44.63 D	1.48E-04	2.20E-06	5.13E-07	2.63E-05	1.24E-04
CO-56	78.76 D	2.61E-04	1.15E-04	5.04E-05	1.28E-04	2.54E-04
CO-57	270.9 D	4.86E-06	0.0	0.0	3.13E-07	3.05E-06
CO-58	70.80 D	5.01E-05	6.84E-07	5.23E-11	8.81E-06	4.41E-05
CO-58M	9.15 H	0.0	0.0	0.0	0.0	0.0
CO-60	5.271 Y	9.80E-05	1.07E-09	0.0	2.45E-05	7.57E-05
CO-60M	10.47 M	3.06E-06	1.37E-06	6.33E-07	1.53E-06	2.97E-06
CO-61	1.650 H	9.64E-04	3.38E-04	1.19E-04	4.06E-04	9.27E-04
NI-56	6.10 D	3.31E-06	0.0	0.0	7.35E-07	2.61E-06
NI-57	36.08 H	2.78E-04	4.79E-05	6.18E-06	7.93E-05	2.61E-04
NI-59	7.5E4 Y	0.0	0.0	0.0	0.0	0.0
NI-63	100.1 Y	0.0	0.0	0.0	0.0	0.0
NI-65	2.520 H	1.38E-03	7.26E-04	4.27E-04	7.85E-04	1.34E-03
CU-61	3.408 H	6.53E-04	2.24E-04	7.46E-05	2.71E-04	6.29E-04
CU-62	9.74 M	2.98E-03	2.07E-03	1.47E-03	2.12E-03	2.95E-03
CU-64	12.701 H	2.10E-04	1.26E-05	2.87E-07	4.35E-05	1.90E-04
CU-67	61.88 D	2.06E-04	3.20E-06	1.92E-08	3.64E-05	1.73E-04
ZN-62	9.26 H	3.63E-05	2.20E-06	3.38E-08	7.52E-06	3.32E-05
ZN-65	244.4 D	2.72E-06	1.84E-10	0.0	6.79E-07	2.20E-06
ZN-69	55.6 M	6.25E-04	1.23E-04	2.04E-05	1.89E-04	5.88E-04
ZN-69M	13.76 H	5.18E-05	6.88E-06	4.17E-12	1.32E-05	4.93E-05
GA-66	9.40 H	2.27E-03	1.74E-03	1.38E-03	1.77E-03	2.26E-03
GA-67	3.261 D	1.05E-05	0.0	0.0	1.13E-06	2.55E-06
GA-68	68.0 M	1.65E-03	9.14E-04	5.13E-04	9.70E-04	1.62E-03
GA-72	14.1 H	1.07E-03	5.08E-04	3.09E-04	5.68E-04	1.03E-03
GE-68	288 D	0.0	0.0	0.0	0.0	0.0
GE-71	11.8 D	0.0	0.0	0.0	0.0	0.0
GE-77	11.30 H	1.43E-03	7.33E-04	4.16E-04	7.96E-04	1.39E-03
AS-72	26.0 H	2.38E-03	1.58E-03	1.08E-03	1.63E-03	2.35E-03
AS-73	80.30 D	0.0	0.0	0.0	0.0	0.0
AS-74	17.77 D	5.55E-04	1.73E-04	6.00E-05	2.18E-04	5.30E-04
AS-76	26.32 H	2.45E-03	1.62E-03	1.11E-03	1.67E-03	2.42E-03
AS-77	38.8 H	4.04E-04	3.55E-05	1.64E-06	9.14E-05	3.70E-04
SE-73	7.15 H	8.11E-04	3.12E-04	1.17E-04	3.63E-04	7.85E-04
SE-75	119.78 D	7.12E-06	0.0	0.0	1.64E-06	4.86E-06
SE-79	6.5E4 Y	1.77E-05	0.0	0.0	1.39E-06	8.36E-06
BR-77	57.04 H	4.63E-06	2.44E-10	0.0	1.16E-06	3.72E-06
BR-80	17.4 M	1.62E-03	8.86E-04	5.05E-04	9.44E-04	1.58E-03
BR-80M	4.42 H	0.0	0.0	0.0	0.0	0.0
BR-82	35.30 H	1.88E-04	1.13E-06	1.61E-11	3.22E-05	1.60E-04
BR-83	2.39 H	6.24E-04	1.25E-04	2.19E-05	1.91E-04	5.87E-04
BR-84	31.80 M	2.93E-03	2.10E-03	1.61E-03	2.16E-03	2.89E-03
BR-85	172 S	2.29E-03	1.45E-03	9.51E-04	1.51E-03	2.26E-03
KR-79	35.04 H	3.51E-05	2.18E-06	3.63E-08	7.31E-06	3.21E-05

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
KR-81	2.1E5 Y	0.0	0.0	0.0	0.0	0.0
KR-83M	1.83 H	0.0	0.0	0.0	0.0	0.0
KR-85	10.72 Y	4.71E-04	5.16E-05	2.72E-06	1.13E-04	4.35E-04
KR-85M	4.48 H	4.87E-04	7.07E-05	9.05E-06	1.30E-04	4.53E-04
KR-87	76.3 M	3.09E-03	2.21E-03	1.65E-03	2.27E-03	3.06E-03
KR-88	2.84 H	7.36E-04	3.51E-04	2.39E-04	3.96E-04	7.03E-04
KR-89	3.16 M	3.20E-03	2.32E-03	1.76E-03	2.37E-03	3.17E-03
KR-90	32.32 S	3.05E-03	2.15E-03	1.58E-03	2.21E-03	3.01E-03
RB-81	4.58 H	4.07E-04	8.81E-05	2.26E-05	1.30E-04	3.77E-04
RB-82	1.25 M	3.28E-03	2.38E-03	1.76E-03	2.43E-03	3.25E-03
RB-83	86.2 D	0.0	0.0	0.0	0.0	0.0
RB-84	32.9 D	3.49E-04	1.40E-04	6.58E-05	1.62E-04	3.37E-04
RB-86	18.66 D	1.49E-03	7.69E-04	4.20E-04	8.31E-04	1.45E-03
RB-87	4.73E10 Y	6.49E-05	0.0	0.0	1.55E-05	4.69E-05
RB-88	17.8 M	5.03E-03	4.05E-03	3.32E-03	4.09E-03	5.00E-03
RB-89	15.44 M	2.34E-03	1.54E-03	1.09E-03	1.60E-03	2.31E-03
RB-90	157 S	4.74E-03	3.79E-03	3.11E-03	3.84E-03	4.71E-03
RB-90M	258 S	3.27E-03	2.40E-03	1.83E-03	2.45E-03	3.24E-03
SR-82	25.0 D	0.0	0.0	0.0	0.0	0.0
SR-85	64.84 D	7.55E-06	1.73E-06	3.39E-08	2.42E-06	7.26E-06
SR-85M	67.66 M	1.11E-05	0.0	0.0	7.17E-07	9.54E-06
SR-87M	2.805 H	1.51E-04	8.26E-06	0.0	3.75E-05	1.42E-04
SR-89	50.55 D	1.28E-03	5.85E-04	2.74E-04	6.49E-04	1.25E-03
SR-90	28.6 Y	3.39E-04	1.36E-05	5.88E-08	6.56E-05	3.05E-04
SR-91	9.5 H	1.44E-03	7.65E-04	4.59E-04	8.27E-04	1.41E-03
SR-92	2.71 H	3.38E-04	4.80E-05	2.31E-05	9.22E-05	3.06E-04
SR-93	7.3 M	2.06E-03	1.21E-03	7.72E-04	1.28E-03	2.01E-03
Y-86	14.74 H	4.93E-04	2.39E-04	1.26E-04	2.63E-04	4.80E-04
Y-87	80.3 H	3.18E-06	5.02E-07	2.42E-09	8.65E-07	3.00E-06
Y-88	106.60 D	1.57E-06	2.63E-07	2.53E-08	4.42E-07	1.48E-06
Y-90	64.1 H	2.15E-03	1.33E-03	8.53E-04	1.39E-03	2.11E-03
Y-90M	3.19 H	1.07E-04	1.77E-05	7.03E-08	2.97E-05	1.01E-04
Y-91	58.51 D	1.33E-03	6.26E-04	3.04E-04	6.90E-04	1.29E-03
Y-91M	49.71 M	6.52E-05	1.86E-05	1.22E-06	2.35E-05	6.30E-05
Y-92	3.54 H	3.42E-03	2.51E-03	1.91E-03	2.56E-03	3.39E-03
Y-93	10.1 H	2.74E-03	1.87E-03	1.33E-03	1.92E-03	2.71E-03
ZR-86	16.5 H	1.88E-05	0.0	0.0	3.67E-06	1.67E-05
ZR-88	83.4 D	2.35E-05	1.39E-06	0.0	6.46E-06	2.21E-05
ZR-89	78.43 H	2.03E-04	5.01E-05	1.15E-05	6.92E-05	1.94E-04
ZR-93	1.53E6 Y	0.0	0.0	0.0	0.0	0.0
ZR-95	64.02 D	1.43E-04	1.50E-06	2.68E-07	2.49E-05	1.18E-04
ZR-97	16.90 H	1.54E-03	8.05E-04	4.43E-04	8.67E-04	1.50E-03
NB-90	14.60 H	8.19E-04	3.54E-04	1.61E-04	3.99E-04	7.82E-04
NB-91	1E4 Y	1.76E-07	0.0	0.0	3.21E-08	1.24E-07
NB-91M	61 D	4.40E-05	0.0	0.0	8.15E-07	1.41E-05
NB-92	3.6E7 Y	3.46E-06	9.89E-07	6.47E-08	1.25E-06	3.35E-06
NB-92M	10.15 D	0.0	0.0	0.0	0.0	0.0
NB-93M	14.6 Y	0.0	0.0	0.0	0.0	0.0
NB-94	2.03E4 Y	2.13E-04	3.30E-06	3.14E-07	3.77E-05	1.83E-04

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
NB-94M	6.26 M	4.34E-06	1.44E-06	4.77E-07	1.76E-06	4.16E-06
NB-95	35.06 D	1.32E-05	1.16E-06	4.00E-07	3.05E-06	7.52E-06
NB-95M	86.6 H	3.51E-04	1.74E-05	5.80E-06	7.11E-05	3.12E-04
NB-96	23.35 H	4.59E-04	5.40E-05	4.37E-06	1.13E-04	4.24E-04
NB-97	72.1 M	9.78E-04	3.47E-04	1.24E-04	4.15E-04	9.41E-04
NB-97M	60 S	3.58E-05	1.63E-05	5.33E-06	1.77E-05	3.50E-05
MO-91	15.49 M	3.40E-03	2.50E-03	1.87E-03	2.54E-03	3.37E-03
MO-93	3.5E3 Y	0.0	0.0	0.0	0.0	0.0
MO-99	66.02 H	8.02E-04	2.54E-04	8.34E-05	3.17E-04	7.65E-04
MO-101	14.61 M	1.12E-03	5.01E-04	2.77E-04	5.66E-04	1.08E-03
TC-95	20.0 H	2.25E-06	1.06E-06	3.69E-07	1.14E-06	2.20E-06
TC-95M	61 D	1.38E-05	3.07E-07	2.05E-08	2.51E-06	1.18E-05
TC-96	4.28 D	2.36E-06	1.13E-06	4.10E-07	1.21E-06	2.31E-06
TC-96M	51.5 M	0.0	0.0	0.0	0.0	0.0
TC-97	2.6E6 Y	0.0	0.0	0.0	0.0	0.0
TC-97M	89 D	2.66E-05	0.0	0.0	7.36E-07	6.59E-06
TC-98	4.2E6 Y	1.54E-04	2.79E-06	6.69E-07	2.76E-05	1.28E-04
TC-99	2.13E5 Y	7.64E-05	1.45E-11	0.0	1.91E-05	5.70E-05
TC-99M	6.02 H	1.48E-05	0.0	0.0	1.02E-06	9.33E-06
TC-101	14.2 M	9.91E-04	3.55E-04	1.31E-04	4.24E-04	9.53E-04
RU-97	2.9 D	1.27E-05	2.10E-09	0.0	3.18E-06	1.09E-05
RU-103	39.35 D	5.41E-05	2.46E-06	1.01E-07	1.07E-05	4.07E-05
RU-105	4.44 H	8.21E-04	2.47E-04	7.50E-05	3.14E-04	7.84E-04
RU-106	368.2 D	0.0	0.0	0.0	0.0	0.0
RH-103M	56.119 M	0.0	0.0	0.0	0.0	0.0
RH-105	35.36 H	2.31E-04	7.73E-06	4.97E-08	4.36E-05	2.03E-04
RH-105M	45 S	9.90E-05	0.0	0.0	5.75E-06	5.75E-05
RH-106	29.92 S	3.31E-03	2.39E-03	1.77E-03	2.44E-03	3.27E-03
PD-103	16.961 D	0.0	0.0	0.0	0.0	0.0
PD-107	6.5E6 Y	0.0	0.0	0.0	0.0	0.0
PD-109	13.453 H	7.21E-04	1.81E-04	4.26E-05	2.48E-04	6.84E-04
AG-106M	8.46 D	7.05E-06	1.14E-06	1.33E-08	1.94E-06	6.66E-06
AG-108	2.37 M	1.33E-03	6.26E-04	3.05E-04	6.89E-04	1.29E-03
AG-108M	127 Y	1.37E-05	3.31E-06	5.56E-07	4.58E-06	1.31E-05
AG-109M	39.6 S	1.66E-05	0.0	0.0	3.42E-07	2.83E-06
AG-110	24.57 S	2.73E-03	1.85E-03	1.29E-03	1.90E-03	2.70E-03
AG-110M	249.85 D	8.32E-05	3.40E-06	3.02E-07	1.62E-05	7.30E-05
AG-111	7.46 D	6.96E-04	1.69E-04	3.92E-05	2.35E-04	6.60E-04
CD-109	464 D	0.0	0.0	0.0	0.0	0.0
CD-111M	48.7 M	1.43E-04	0.0	0.0	2.82E-05	1.03E-04
CD-113	9.3E15 Y	9.42E-05	1.87E-09	0.0	2.36E-05	7.27E-05
CD-113M	13.7 Y	3.03E-04	1.28E-05	1.26E-07	5.90E-05	2.70E-04
CD-115	53.46 H	6.06E-04	1.45E-04	3.89E-05	2.04E-04	5.71E-04
CD-115M	44.6 D	1.32E-03	6.10E-04	2.92E-04	6.74E-04	1.28E-03
CD-117	2.49 H	8.92E-04	4.10E-04	2.33E-04	4.61E-04	8.59E-04
CD-117M	3.36 H	3.48E-04	4.77E-05	1.53E-05	9.24E-05	3.17E-04
IN-111	2.83 D	4.71E-05	0.0	0.0	9.32E-06	3.87E-05
IN-113M	1.658 H	2.98E-04	1.43E-05	0.0	8.05E-05	2.81E-04
IN-114	71.9 S	1.72E-03	9.45E-04	5.38E-04	1.01E-03	1.68E-03

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
IN-114M	49.51 D	2.36E-04	0.0	0.0	4.05E-06	1.92E-04
IN-115	4.6E15 Y	2.25E-04	3.33E-06	1.18E-09	3.97E-05	1.95E-04
IN-115M	4.36 H	3.65E-04	5.15E-06	4.72E-07	6.43E-05	3.39E-04
IN-116M	54.15 M	5.81E-04	1.20E-04	2.40E-05	1.81E-04	5.45E-04
IN-117	43.8 M	4.73E-04	5.14E-05	3.76E-06	1.14E-04	4.31E-04
IN-117M	116.5 M	9.38E-04	3.72E-04	1.89E-04	4.36E-04	9.04E-04
SN-113	115.1 D	0.0	0.0	0.0	0.0	0.0
SN-117M	13.60 D	1.96E-04	0.0	0.0	1.73E-05	1.38E-04
SN-119M	293.0 D	3.00E-07	0.0	0.0	1.33E-09	0.0
SN-123	129.2 D	1.15E-03	4.85E-04	2.10E-04	5.49E-04	1.11E-03
SN-125	9.64 D	1.85E-03	1.14E-03	7.35E-04	1.19E-03	1.82E-03
SN-126	1.0E5 Y	5.19E-05	0.0	0.0	1.07E-05	3.44E-05
SB-117	2.80 H	3.09E-05	3.76E-07	2.44E-09	5.40E-06	2.30E-05
SB-122	2.70 D	1.23E-03	5.61E-04	2.75E-04	6.24E-04	1.19E-03
SB-124	60.20 D	7.77E-04	3.40E-04	1.96E-04	3.89E-04	7.45E-04
SB-125	2.77 Y	1.07E-04	4.30E-06	9.05E-08	2.08E-05	9.08E-05
SB-126	12.4 D	5.89E-04	2.04E-04	9.61E-05	2.50E-04	5.58E-04
SB-126M	19.0 M	1.30E-03	6.48E-04	3.39E-04	7.05E-04	1.27E-03
SB-127	3.85 D	6.09E-04	1.33E-04	3.11E-05	1.95E-04	5.73E-04
SB-129	4.40 H	7.19E-04	2.64E-04	1.30E-04	3.18E-04	6.85E-04
TE-121	16.8 D	6.33E-06	1.68E-06	9.22E-08	2.19E-06	6.10E-06
TE-121M	154 D	3.16E-05	0.0	0.0	3.60E-07	2.00E-05
TE-123	1E13 Y	0.0	0.0	0.0	0.0	0.0
TE-123M	119.7 D	4.28E-05	0.0	0.0	3.78E-06	2.05E-05
TE-125M	58 D	4.88E-05	0.0	0.0	1.89E-06	2.02E-05
TE-127	9.35 H	3.92E-04	3.42E-05	1.62E-06	8.84E-05	3.58E-04
TE-127M	109 D	2.51E-05	1.14E-06	8.28E-06	4.96E-06	1.09E-05
TE-129	69.6 M	1.12E-03	4.56E-04	1.93E-04	5.22E-04	1.08E-03
TE-129M	33.6 D	4.97E-04	2.20E-04	1.08E-04	2.47E-04	4.68E-04
TE-131	25.0 M	1.56E-03	8.06E-04	4.50E-04	8.72E-04	1.52E-03
TE-131M	30 H	3.02E-04	6.08E-05	3.72E-05	9.70E-05	2.67E-04
TE-132	78.2 H	6.49E-05	0.0	0.0	1.13E-05	4.80E-05
TE-133	12.45 M	1.85E-03	1.06E-03	6.50E-04	1.12E-03	1.81E-03
TE-133M	55.4 M	1.55E-03	8.30E-04	4.84E-04	8.93E-04	1.51E-03
TE-134	41.8 M	1.67E-04	1.31E-06	2.08E-08	2.86E-05	1.38E-04
I-122	3.62 M	2.41E-03	1.69E-03	1.22E-03	1.73E-03	2.38E-03
I-123	13.13 H	2.58E-05	0.0	0.0	2.29E-06	1.76E-05
I-124	4.18 D	4.43E-04	2.46E-04	1.41E-04	2.62E-04	4.35E-04
I-125	60.14 D	0.0	0.0	0.0	0.0	0.0
I-126	12.93 D	2.60E-04	6.32E-05	1.74E-05	8.84E-05	2.45E-04
I-128	24.99 M	1.70E-03	9.57E-04	5.60E-04	1.01E-03	1.67E-03
I-129	1.57E7 Y	8.43E-06	0.0	0.0	6.94E-07	3.70E-06
I-130	12.36 H	5.45E-04	1.07E-04	2.35E-05	1.66E-04	5.10E-04
I-131	8.040 D	3.10E-04	1.47E-05	2.55E-07	6.15E-05	2.77E-04
I-132	2.30 H	1.04E-03	4.26E-04	2.01E-04	4.90E-04	9.99E-04
I-133	20.8 H	8.40E-04	2.71E-04	9.00E-05	3.36E-04	8.04E-04
I-134	52.6 M	1.32E-03	6.27E-04	3.20E-04	6.92E-04	1.29E-03
I-135	6.61 H	7.44E-04	2.39E-04	9.00E-05	2.98E-04	7.09E-04
I-136	83 S	4.87E-03	3.87E-03	3.13E-03	3.91E-03	4.84E-03

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
XE-122	20.1 H	2.60E-06	7.33E-09	0.0	6.51E-07	2.01E-06
XE-123	2.14 H	3.63E-04	1.50E-04	6.78E-05	1.72E-04	3.43E-04
XE-125	16.8 H	3.11E-05	6.89E-08	1.06E-10	5.23E-06	2.55E-05
XE-127	36.406 D	3.60E-05	4.52E-08	0.0	9.00E-06	2.84E-05
XE-129M	8.89 D	2.75E-04	0.0	0.0	3.69E-05	2.23E-04
XE-131M	11.84 D	1.90E-04	0.0	0.0	1.80E-05	1.37E-04
XE-133	5.245 D	1.11E-04	1.57E-08	0.0	2.77E-05	6.65E-05
XE-133M	2.19 D	3.54E-04	0.0	0.0	6.43E-05	3.06E-04
XE-135	9.11 H	6.12E-04	1.10E-04	1.83E-05	1.79E-04	5.72E-04
XE-135M	15.36 M	2.30E-04	5.25E-05	1.11E-06	7.35E-05	2.21E-04
XE-137	3.83 M	4.22E-03	3.25E-03	2.56E-03	3.30E-03	4.19E-03
XE-138	14.13 M	1.36E-03	7.54E-04	4.79E-04	8.10E-04	1.33E-03
CS-126	1.64 M	3.15E-03	2.34E-03	1.79E-03	2.39E-03	3.12E-03
CS-129	32.06 H	7.40E-06	2.40E-07	0.0	1.95E-06	6.95E-06
CS-131	9.688 D	0.0	0.0	0.0	0.0	0.0
CS-132	6.475 D	1.49E-05	3.26E-06	5.44E-07	4.75E-06	1.40E-05
CS-134	2.062 Y	2.70E-04	2.26E-05	1.55E-06	6.04E-05	2.46E-04
CS-134M	2.90 H	8.83E-05	0.0	0.0	5.44E-06	5.01E-05
CS-135	2.3E6 Y	2.70E-05	0.0	0.0	3.92E-06	1.63E-05
CS-136	13.16 D	1.54E-04	4.81E-06	1.91E-06	2.91E-05	1.23E-04
CS-137	30.17 Y	2.69E-04	1.85E-05	4.42E-06	5.79E-05	2.39E-04
CS-138	32.2 M	2.83E-03	1.95E-03	1.38E-03	2.00E-03	2.80E-03
CS-139	9.40 M	3.93E-03	2.99E-03	2.33E-03	3.03E-03	3.90E-03
BA-131	11.8 D	3.29E-05	1.02E-06	2.54E-09	6.16E-06	2.18E-05
BA-133	10.5 Y	1.88E-05	1.35E-07	0.0	4.74E-06	1.62E-05
BA-133M	38.9 H	4.19E-04	0.0	0.0	1.02E-04	3.77E-04
BA-135M	28.7 H	4.10E-04	0.0	0.0	9.47E-05	3.67E-04
BA-137M	2.552 M	1.57E-04	5.93E-05	1.16E-05	6.76E-05	1.52E-04
BA-139	83.1 M	2.03E-03	1.21E-03	7.51E-04	1.27E-03	1.99E-03
BA-140	12.789 D	5.26E-04	1.09E-04	2.42E-05	1.65E-04	4.91E-04
BA-141	18.27 M	1.92E-03	1.12E-03	7.01E-04	1.18E-03	1.88E-03
BA-142	10.70 M	9.47E-04	3.72E-04	1.75E-04	4.35E-04	9.10E-04
LA-140	40.22 H	1.14E-03	4.67E-04	2.04E-04	5.34E-04	1.10E-03
LA-141	3.94 H	2.15E-03	1.33E-03	8.55E-04	1.39E-03	2.12E-03
LA-142	95.4 M	1.92E-03	1.17E-03	7.66E-04	1.22E-03	1.89E-03
CE-139	137.66 D	3.26E-05	0.0	0.0	3.17E-06	2.23E-05
CE-141	32.50 D	2.30E-04	3.94E-06	2.90E-08	4.09E-05	1.91E-04
CE-143	33.0 H	8.54E-04	2.71E-04	9.40E-05	3.39E-04	8.16E-04
CE-144	284.3 D	7.91E-05	7.32E-10	0.0	1.98E-05	5.83E-05
PR-142	19.13 H	1.87E-03	1.10E-03	6.80E-04	1.16E-03	1.83E-03
PR-143	13.56 D	6.14E-04	1.25E-04	2.26E-05	1.89E-04	5.77E-04
PR-144	17.28 M	2.80E-03	1.92E-03	1.36E-03	1.97E-03	2.77E-03
PR-144M	7.2 M	1.97E-09	0.0	0.0	3.84E-13	0.0
ND-147	10.98 D	4.25E-04	5.58E-05	5.83E-06	1.09E-04	3.89E-04
ND-149	1.73 H	9.70E-04	3.37E-04	1.28E-04	4.07E-04	9.26E-04
PM-143	265 D	2.46E-06	1.07E-06	3.12E-07	1.18E-06	2.40E-06
PM-144	363 D	1.96E-05	5.96E-06	9.08E-07	7.39E-06	1.90E-05
PM-145	17.7 Y	6.80E-08	0.0	0.0	6.00E-10	8.81E-11
PM-146	2020 D	1.76E-04	2.41E-05	2.51E-06	4.58E-05	1.63E-04

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ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
PM-147	2.6234 Y	3.58E-05	0.0	0.0	6.11E-06	2.31E-05
PM-148	5.37 D	1.61E-03	9.04E-04	5.54E-04	9.64E-04	1.58E-03
PM-148M	41.3 D	2.44E-04	1.61E-05	1.34E-06	5.17E-05	2.15E-04
PM-149	53.08 H	7.32E-04	1.91E-04	4.87E-05	2.58E-04	6.95E-04
PM-151	28.40 H	5.42E-04	1.05E-04	2.21E-05	1.64E-04	5.05E-04
SM-147	1.069E11 Y	0,0	0.0	0.0	0.0	0.0
SM-151	90 Y	0.0	0.0	0.0	0.0	0.0
SM-153	46.7 H	3.98E-04	3.69E-05	2.46E-06	9.14E-05	3.61E-04
EU-152	13.6 Y	1.90E-04	4.69E-05	1.80E-05	6.59E-05	1.71E-04
EU-152M	9.32 H	1.07E-03	5.52E-04	2.97E-04	5.96E-04	1.05E-03
EU-154	8.8 Y	4.37E-04	1.13E-04	5.13E-05	1.57E-04	3.96E-04
EU-155	4.96 Y	1.62E-05	0.0	0.0	3.24E-06	9.09E-06
EU-156	15.19 D	8.10E-04	4.11E-04	2.52E-04	4.51E-04	7.77E-04
GD-152	1.1E14 Y	0.0	0.0	0.0	0.0	0.0
GD-153	241.6 D	4.49E-06	0.0	0.0	1.49E-07	1.57E-06
GD-159	18.56 H	6.05E-04	1.25E-04	2.43E-05	1.88E-04	5.68E-04
GD-162	9.7 M	6.35E-04	1.34E-04	2.59E-05	1.99E-04	5.98E-04
TB-157	150 Y	0.0	0.0	0.0	0.0	0.0
TB-160	72.3 D	4.14E-04	6.80E-05	2.23E-05	1.18E-04	3.74E-04
TB-162	7.76 M	1.04E-03	3.96E-04	1.58E-04	4.63E-04	9.96E-04
DY-157	8.06 H	7.39E-06	5.78E-09	0.0	1.85E-06	6.76E-06
DY-165	2.334 H	9.16E-04	3.15E-04	1.11E-04	3.81E-04	8.79E-04
DY-166	81.6 H	1.51E-04	4.12E-07	3.43E-11	2.54E-05	1.24E-04
HO-166	26.80 H	1.50E-03	7.72E-04	4.15E-04	8.34E-04	1.46E-03
HO-166M	1.20E3 Y	1.28E-04	1.71E-05	5.64E-06	3.36E-05	1.05E-04
ER-169	9.40 D	1.07E-04	1.40E-08	0.0	2.68E-05	8.47E-05
ER-171	7.52 H	7.43E-04	1.89E-04	4.95E-05	2.58E-04	6.98E-04
TM-170	128.6 D	6.15E-04	1.27E-04	2.41E-05	1.91E-04	5.77E-04
TM-171	1.92 Y	4.11E-07	0.0	0.0	1.15E-08	4.59E-08
YB-169	31.97 D	7.34E-05	8.48E-10	0.0	1.84E-05	5.02E-05
YB-175	4.19 D	1.76E-04	1.56E-06	8.19E-11	3.03E-05	1.50E-04
LU-177	6.71 D	1.95E-04	2.53E-06	1.00E-09	3.41E-05	1.64E-04
LU-177M	160.10 D	2.02E-04	4.33E-07	0.0	5.06E-05	1.36E-04
HF-181	42.39 D	2.23E-04	2.94E-06	6.14E-09	3.92E-05	1.78E-04
TA-182	114.74 D	1.98E-04	4.34E-06	1.01E-06	3.60E-05	1.56E-04
W-181	120.95 D	0.0	0.0	0.0	0.0	0.0
W-185	75.1 D	1.67E-04	6.95E-07	0.0	4.22E-05	1.40E-04
W-187	23.83 H	5.11E-04	1.07E-04	3.40E-05	1.63E-04	4.75E-04
W-188	69.4 D	1.07E-04	1.83E-08	0.0	2.69E-05	8.49E-05
RE-182	64.0 H	1.15E-04	0.0	0.0	1.50E-07	7.40E-05
RE-182M	12.7 H	5.51E-05	1.68E-05	8.74E-06	2.18E-05	3.93E-05
RE-183	70 D	3.58E-05	0.0	0.0	5.99E-06	1.94E-05
RE-184	38.0 D	3.33E-05	3.73E-06	1.42E-06	8.27E-06	1.94E-05
RE-184M	169 D	4.25E-05	0.0	0.0	8.72E-06	2.14E-05
RE-186	90.64 H	6.61E-04	1.62E-04	3.95E-05	2.24E-04	6.22E-04
RE-187	4.7E10 Y	0.0	0.0	0.0	0.0	0.0
RE-188	16.98 H	1.72E-03	9.47E-04	5.49E-04	1.01E-03	1.68E-03
OS-185	93.6 D	1.40E-05	4.38E-06	5.66E-07	5.35E-06	1.32E-05
OS-186	2.0E15 Y	0.0	0.0	0.0	0.0	0.0

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
OS-190M	9.9 M	1.38E-04	9.29E-06	4.71E-07	2.93E-05	1.19E-04
OS-191	15.4 D	2.55E-05	0.0	0.0	1.72E-06	1.42E-05
OS-191M	13.03 H	1.68E-06	0.0	0.0	1.39E-08	1.16E-08
OS-193	30.0 H	6.96E-04	1.76E-04	4.65E-05	2.41E-04	6.58E-04
IR-190	11.78 D	9.21E-05	4.08E-06	1.03E-07	1.81E-05	7.71E-05
IR-190M	1.2 H	0.0	0.0	0.0	0.0	0.0
IR-190M	3.2 H	7.52E-06	0.0	0.0	4.25E-08	5.30E-06
IR-192	74.02 D	3.67E-04	1.76E-05	5.68E-07	7.30E-05	3.29E-04
IR-193M	11.9 D	6.18E-06	0.0	0.0	8.79E-08	3.11E-07
IR-194	19.15 H	1.82E-03	1.05E-03	6.31E-04	1.11E-03	1.79E-03
IR-194M	171 D	1.93E-04	1.29E-05	9.76E-07	4.09E-05	1.60E-04
PT-191	2.71 D	3.77E-05	1.50E-06	3.64E-09	7.28E-06	2.97E-05
PT-193	50 Y	0.0	0.0	0.0	0.0	0.0
PT-193M	4.33 D	1.22E-04	0.0	0.0	7.77E-06	7.90E-05
PT-195M	4.02 D	1.19E-04	0.0	0.0	6.87E-06	7.03E-05
PT-197	18.3 H	3.37E-04	2.08E-05	6.54E-07	7.02E-05	3.00E-04
PT-197M	94.4 M	5.74E-04	5.47E-06	6.23E-08	9.94E-05	5.29E-04
AU-194	39.5 H	5.72E-05	9.72E-06	4.01E-06	1.67E-05	5.34E-05
AU-195	183 D	6.69E-06	0.0	0.0	3.68E-07	2.10E-06
AU-195M	30.6 S	1.07E-04	1.72E-09	0.0	2.68E-05	9.09E-05
AU-196	6.183 D	5.09E-05	3.78E-07	0.0	1.29E-05	4.62E-05
AU-198	2.696 D	6.39E-04	1.28E-04	2.44E-05	1.96E-04	6.02E-04
AU-199	3.139 D	1.45E-04	1.56E-07	4.12E-13	2.43E-05	1.09E-04
HG-197	64.14 H	2.70E-06	0.0	0.0	1.09E-07	3.22E-07
HG-197M	23.8 H	2.49E-04	0.0	0.0	5.63E-05	1.79E-04
HG-203	46.60 D	1.21E-04	0.0	0.0	2.98E-05	9.82E-05
TL-200	26.1 H	5.46E-05	8.83E-06	3.82E-06	1.56E-05	5.14E-05
TL-201	73.06 H	1.50E-05	0.0	0.0	1.47E-06	8.51E-06
TL-202	12.23 D	3.00E-05	2.02E-06	0.0	8.50E-06	2.83E-05
TL-204	3.779 Y	4.85E-04	6.88E-05	6.49E-06	1.28E-04	4.51E-04
TL-207	4.77 M	1.05E-03	4.08E-04	1.66E-04	4.74E-04	1.01E-03
TL-208	3.053 M	1.28E-03	5.54E-04	2.62E-04	6.26E-04	1.24E-03
TL-209	2.20 M	1.50E-03	7.38E-04	3.86E-04	8.06E-04	1.46E-03
TL-210	1.30 M	1.53E-03	7.45E-04	4.02E-04	8.19E-04	1.48E-03
PB-203	52.02 H	9.52E-05	1.72E-08	0.0	2.38E-05	8.31E-05
PB-204M	66.9 M	2.43E-04	1.08E-04	4.91E-05	1.21E-04	2.36E-04
PB-205	1.51E7 Y	0.0	0.0	0.0	0.0	0.0
PB-209	3.253 H	3.33E-04	2.07E-05	5.40E-07	6.93E-05	3.00E-04
PB-210	22.26 Y	0.0	0.0	0.0	0.0	0.0
PB-211	36.1 M	9.52E-04	3.49E-04	1.35E-04	4.14E-04	9.16E-04
PB-212	10.643 H	2.23E-04	9.60E-07	6.73E-09	3.78E-05	1.78E-04
PB-214	26.8 M	5.10E-04	3.98E-05	3.78E-06	1.12E-04	4.63E-04
BI-206	6.243 D	2.17E-04	3.41E-05	6.90E-06	6.00E-05	1.95E-04
BI-207	33.4 Y	2.64E-04	1.48E-04	7.84E-05	1.56E-04	2.60E-04
BI-208	3.68E5 Y	1.06E-05	8.72E-06	7.24E-06	8.79E-06	1.06E-05
BI-210	5.013 D	7.93E-04	2.34E-04	6.92E-05	2.99E-04	7.56E-04
BI-211	2.13 M	2.03E-05	1.10E-07	2.31E-10	3.46E-06	1.86E-05
BI-212	60.55 M	1.03E-03	5.70E-04	3.38E-04	6.08E-04	1.01E-03
BI-213	45.65 M	9.16E-04	3.06E-04	1.14E-04	3.75E-04	8.78E-04

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ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
BI-214	19.9 M	1.42E-03	7.37E-04	4.30E-04	8.00E-04	1.39E-03
PO-209	102 Y	3.73E-07	0.0	0.0	4.46E-11	3.03E-07
PO-210	138.378 D	0.0	0.0	0.0	0.0	0.0
PO-211	0.516 S	0.0	0.0	0.0	0.0	0.0
PO-212	2.98E-7 S	0.0	0.0	0.0	0.0	0.0
PO-213	4.2E-6 S	0.0	0.0	0.0	0.0	0.0
PO-214	1.637E-4 S	0.0	0.0	0.0	0.0	0.0
PO-215	1.778E-3 S	0.0	0.0	0.0	0.0	0.0
PO-216	0.146 S	0.0	0.0	0.0	0.0	0.0
PO-218	3.05 M	0.0	0.0	0.0	0.0	0.0
AT-211	7.214 H	1.46E-09	0.0	0.0	1.14E-12	0.0
AT-217	0.0323 S	0.0	0.0	0.0	0.0	0.0
RN-218	0.035 S	0.0	0.0	0.0	0.0	0.0
RN-219	3.96 S	1.16E-05	6.58E-08	0.0	2.93E-06	1.02E-05
RN-220	55.61 S	0.0	0.0	0.0	0.0	0.0
RN-222	3.8235 D	0.0	0.0	0.0	0.0	0.0
FR-221	4.8 M	1.40E-05	0.0	0.0	2.24E-06	1.13E-05
FR-223	21.8 M	6.94E-04	1.70E-04	4.22E-05	2.36E-04	6.53E-04
RA-222	38.0 S	1.46E-06	1.61E-09	0.0	3.64E-07	1.32E-06
RA-223	11.434 D	7.40E-05	5.12E-08	0.0	1.85E-05	6.02E-05
RA-224	3.62 D	3.87E-06	0.0	0.0	7.22E-07	3.28E-06
RA-225	14.8 D	9.59E-05	1.14E-08	0.0	2.40E-05	7.46E-05
RA-226	1600 Y	4.94E-06	0.0	0.0	5.94E-07	3.87E-06
RA-228	5.75 Y	0.0	0.0	0.0	0.0	0.0
AC-225	10.0 D	2.04E-06	0.0	0.0	1.37E-07	6.37E-07
AC-227	21.773 Y	0.0	0.0	0.0	0.0	0.0
AC-228	6.13 H	7.75E-04	2.65E-04	1.13E-04	3.25E-04	7.33E-04
TH-226	30.9 M	1.17E-05	0.0	0.0	4.60E-07	4.41E-06
TH-227	18.718 D	2.11E-05	8.31E-11	0.0	5.28E-06	1.73E-05
TH-228	1.9132 Y	1.69E-06	0.0	0.0	2.86E-08	1.53E-07
TH-229	7.34E3 Y	3.52E-05	0.0	0.0	5.16E-06	2.12E-05
TH-230	7.7E4 Y	5.33E-08	0.0	0.0	2.68E-10	0.0
TH-231	25.52 H	6.79E-05	7.29E-11	0.0	1.70E-05	4.86E-05
TH-232	1.405E10 Y	9.19E-08	0.0	0.0	3.28E-09	4.46E-08
TH-233	22.3 M	8.26E-04	2.56E-04	8.28E-05	3.22E-04	7.89E-04
TH-234	24.10 D	1.64E-05	0.0	0.0	2.04E-06	8.35E-06
PA-230	17.4 D	3.88E-05	1.74E-06	3.76E-08	7.64E-06	3.42E-05
PA-231	3.276E4 Y	1.11E-05	2.66E-09	0.0	2.78E-06	9.43E-06
PA-233	27.0 D	2.33E-04	8.27E-08	0.0	5.82E-05	1.95E-04
PA-234	6.70 H	7.01E-04	7.90E-05	1.68E-05	1.72E-04	5.85E-04
PA-234M	1.17 M	1.87E-03	1.08E-03	6.58E-04	1.14E-03	1.83E-03
U-230	20.8 D	5.15E-07	0.0	0.0	3.22E-08	1.73E-07
U-231	4.2 D	1.08E-06	0.0	0.0	1.80E-08	8.43E-08
U-232	72 Y	1.65E-07	0.0	0.0	6.33E-09	8.54E-08
U-233	1.592E5 Y	2.72E-08	0.0	0.0	3.29E-10	1.37E-09
U-234	2.445E5 Y	9.95E-08	0.0	0.0	3.09E-09	4.17E-08
U-235	7.038E8 Y	9.05E-06	0.0	0.0	1.22E-06	6.01E-06
U-236	2.3415E7 Y	7.75E-08	0.0	0.0	1.87E-09	2.30E-08
U-237	6.75 D	1.25E-04	0.0	0.0	2.60E-05	8.38E-05

[illegible] IN DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
U-238	4.468E9 Y	6.11E-08	0.0	0.0	1.34E-09	1.53E-08
U-239	23.40 M	8.14E-04	2.51E-04	7.98E-05	3.16E-04	7.77E-04
U-240	14.1 H	1.[illegible]-04	7.23E-07	0.0	4.16E-05	1.38E-04
NP-235	396.1 D	2.[illegible]-09	0.0	0.0	2.60E-11	4.47E-11
NP-236	1.15E6 Y	1.36E-04	2.52E-09	0.0	3.40E-05	8.47E-05
NP-236M	22.5 H	1.14E-04	2.97E-06	2.94E-08	2.10E-05	9.97E-05
NP-237	2.14E6 Y	3.62E-06	0.0	0.0	2.41E-07	1.43E-06
NP-238	2.117 D	4.22E-04	1.29E-04	4.34E-05	1.63E-04	3.96E-04
NP-239	2.355 D	2.71E-04	1.76E-06	7.48E-08	4.64E-05	2.15E-04
NP-240	65 M	5.92E-04	6.23E-05	5.60E-06	1.41E-04	5.18E-04
NP-240M	7.4 M	1.30E-03	6.35E-04	3.36E-04	6.96E-04	1.27E-03
PU-236	2.851 Y	0.0	0.0	0.0	0.0	0.0
PU-237	45.3 D	8.85E-08	0.0	0.0	9.19E-10	2.39E-09
PU-238	87.75 Y	0.0	0.0	0.0	0.0	0.0
PU-239	24131 Y	0.0	0.0	0.0	0.0	0.0
PU-240	6537 Y	0.0	0.0	0.0	0.0	0.0
PU-241	14.4 Y	0.0	0.0	0.0	0.0	0.0
PU-242	3.758E5 Y	0.0	0.0	0.0	0.0	0.0
PU-243	4.956 H	2.49E-04	7.39E-06	5.41E-08	4.64E-05	2.18E-04
PU-244	8.26E7 Y	0.0	0.0	0.0	0.0	0.0
PU-245	10.57 H	5.96E-04	9.09E-05	1.96E-05	1.63E-04	5.47E-04
PU-246	10.85 D	3.06E-05	8.10E-10	0.0	7.65E-06	2.17E-05
AM-241	432.2 Y	8.89E-08	0.0	0.0	2.22E-09	1.84E-08
AM-242	16.02 H	2.66E-04	1.57E-05	4.08E-07	5.48E-05	2.39E-04
AM-242M	152 Y	2.12E-09	0.0	0.0	7.67E-12	0.0
AM-243	7.38E3 Y	2.30E-07	0.0	0.0	2.68E-09	2.43E-09
AM-244	10.1 H	3.33E-04	3.85E-05	9.29E-06	8.26E-05	2.64E-04
AM-245	122.4 M	5.17E-04	7.55E-05	1.11E-05	1.38E-04	4.74E-04
AM-246	25.0 M	9.06E-04	3.23E-04	1.32E-04	3.88E-04	8.68E-04
CM-242	163.2 D	0.0	0.0	0.0	0.0	0.0
CM-243	28.5 Y	1.23E-04	0.0	0.0	2.98E-05	9.33E-05
CM-244	18.11 Y	0.0	0.0	0.0	0.0	0.0
CM-245	8.5E3 Y	4.50E-05	0.0	0.0	4.73E-06	2.98E-05
CM-246	4.75E3 Y	0.0	0.0	0.0	0.0	0.0
CM-247	1.56E7 Y	2.14E-05	1.31E-07	0.0	5.41E-06	1.88E-05
CM-248	3.39E5 Y	0.0	0.0	0.0	0.0	0.0
CM-249	64.15 M	5.14E-04	8.70E-05	1.31E-05	1.46E-04	4.79E-04
CM-250	6.9E3 Y	0.0	0.0	0.0	0.0	0.0
BK-249	320 D	3.30E-06	0.0	0.0	1.82E-07	1.10E-06
BK-250	3.222 H	5.34E-04	1.23E-04	4.64E-05	1.79E-04	4.99E-04
BK-251	57.0 M	7.27E-04	1.97E-04	5.36E-05	2.61E-04	6.91E-04
CF-248	333.5 D	0.0	0.0	0.0	0.0	0.0
CF-249	350.6 Y	2.64E-05	9.08E-08	0.0	6.64E-06	2.16E-05
CF-250	13.08 Y	2.07E-08	0.0	0.0	2.20E-10	6.21E-10
CF-251	9.0E2 Y	2.02E-04	0.0	0.0	3.47E-05	1.54E-04
CF-252	2.639 Y	1.95E-08	0.0	0.0	2.27E-10	8.50E-10
CF-253	17.81 D	6.63E-05	0.0	0.0	1.72E-05	4.85E-05
CF-254	60.5 D	0.0	0.0	0.0	0.0	0.0
ES-253	20.467 D	0.0	0.0	0.0	0.0	0.0

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
ES-254	275.7 D	8.52E-08	0.0	0.0	1.15E-09	3.98E-09
ES-254M	39.3 H	2.98E-04	4.04E-05	8.80E-06	7.81E-05	2.68E-04
ES-255	39.8 D	5.73E-05	0.0	0.0	1.42E-05	4.15E-05
FM-254	3.240 H	1.57E-07	0.0	0.0	3.68E-09	3.30E-08
FM-255	20.07 H	2.30E-06	0.0	0.0	3.28E-08	1.22E-07
FM-256	157.6 M	0.0	0.0	0.0	0.0	0.0

DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
H-3	12.28 Y	0.0	0.0	0.0
BE-7	53.44 D	1.95E-04	0.0	1.95E-04
BE-10	1.6E6 Y	0.0	3.01E-04	3.01E-04
C-11	20.48 M	4.01E-03	7.43E-04	4.76E-03
C-14	5.73E3 Y	0.0	6.17E-06	6.17E-06
N-13	9.97 M	4.01E-03	1.00E-03	5.02E-03
N-16	7.13 S	2.08E-02	6.55E-03	2.74E-02
O-15	122.24 S	4.02E-03	1.59E-03	5.61E-03
F-18	109.74 M	3.89E-03	4.02E-04	4.29E-03
NA-22	2.602 Y	8.80E-03	3.00E-04	9.10E-03
NA-24	15.00 H	1.81E-02	1.15E-03	1.92E-02
MG-27	9.458 M	3.69E-03	1.51E-03	5.20E-03
MG-28	20.91 H	5.55E-03	1.90E-04	5.74E-03
AL-26	7.2E5 Y	1.13E-02	8.13E-04	1.21E-02
AL-28	2.240 M	7.66F-03	2.84E-03	1.05E-02
SI-31	157.3 M	3.61E-06	1.25E-03	1.25E-03
SI-32	3.3E2 Y	0.0	2.32E-05	2.32E-05
P-32	14.29 D	0.0	1.49E-03	1.49E-03
P-33	25.4 D	0.0	4.05E-05	4.05E-05
S-35	87.44 D	0.0	7.91E-06	7.91E-06
CL-36	3.01E5 Y	3.37E-10	4.16E-04	4.16E-04
CL-38	37.21 M	6.57E-03	3.60E-03	1.02E-02
AR-37	35.02 D	5.38E-08	0.0	5.38E-08
AR-39	269 Y	0.0	3.47E-04	3.47E-04
AR-41	1.827 H	5.22E-03	9.31E-04	6.15E-03
K-40	1.277E9 Y	6.34E-04	9.28E-04	1.56E-03
K-42	12.36 H	1.13E-03	3.32E-03	4.45E-03
K-43	22.6 H	3.83E-03	5.50E-04	4.38E-03
CA-41	1.03E5 Y	1.25E-07	0.0	1.25E-07
CA-45	162.7 D	5.43E-13	4.24E-05	4.24E-05
CA-47	4.536 D	4.32E-03	6.47E-04	4.96E-03
CA-49	8.719 M	1.43E-02	1.92E-03	1.62E-02
SC-44	3.927 H	8.60E-03	1.27E-03	9.87E-03
SC-46	83.80 D	8.30E-03	1.06E-04	8.41E-03
SC-46M	18.72 S	3.48E-04	4.96E-05	3.98E-04
SC-47	3.422 D	4.19E-04	2.16E-04	6.35E-04
SC-48	43.67 H	1.38E-02	3.47E-04	1.42E-02
SC-49	57.4 M	4.45E-06	1.80E-03	1.81E-03
TI-44	47.3 Y	5.55E-04	8.36E-09	5.55E-04
TI-45	3.08 H	3.43E-03	7.43E-04	4.17E-03
TI-51	5.752 M	1.44F-03	1.91E-03	3.35E-03
V-48	15.971 D	1.19E-02	2.59E-04	1.22E-02
V-49	330 D	3.79E-07	0.0	3.79E-07
V-52	3.75 M	5.87E-03	2.41E-03	8.28E-03
CR-49	42.09 M	4.12E-03	1.27E-03	5.38E-03
CR-51	27.704 D	1.22E-04	0.0	1.22E-04
MN-52	5.591 D	1.41E-02	1.16E-04	1.42E-02
MN-52M	21.4 M	9.66E-03	2.57E-03	1.22E-02
MN-53	3.7E6 Y	7.05E-07	0.0	7.05E-07

DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
MN-54	312.7 D	3.45E-03	0.0	3.45E-03
MN-56	2.5785 H	7.23E-03	1.83E-03	9.06E-03
MN-57	1.47 M	2.90E-04	2.49E-03	2.78E-03
FE-52	8.275 H	2.88E-03	3.62E-04	3.24E-03
FE-55	2.7 Y	9.30E-07	0.0	9.30E-07
FE-59	44.63 D	4.87E-03	1.24E-04	4.99E-03
CO-56	78.76 D	1.53E-02	2.54E-04	1.56E-02
CO-57	270.9 D	4.75E-04	3.05E-06	4.78E-04
CO-58	70.80 D	3.99E-03	4.41E-05	4.03E-03
CO-58M	9.15 H	1.35E-06	0.0	1.35E-06
CO-60	5.271 Y	1.02E-02	7.57E-05	1.03E-02
CO-60M	10.47 M	1.93E-05	2.97E-06	2.23E-05
CO-61	1.650 H	3.65E-04	9.27E-04	1.29E-03
NI-56	6.10 D	6.96E-03	2.61E-06	6.96E-03
NI-57	36.08 H	7.86E-03	2.61E-04	8.12E-03
NI-59	7.5E4 Y	1.57E-06	0.0	1.57E-06
NI-63	100.1 Y	0.0	0.0	0.0
NI-65	2.520 H	2.24E-03	1.34E-03	3.58E-03
CU-61	3.408 H	3.25E-03	6.29E-04	3.88E-03
CU-62	9.74 M	3.96E-03	2.95E-03	6.91E-03
CU-64	12.701 H	7.46E-04	1.90E-04	9.37E-04
CU-67	61.88 D	4.43E-04	1.73E-04	6.16E-04
ZN-62	9.26 H	1.78E-03	3.32E-05	1.82E-03
ZN-65	244.4 D	2.39E-03	2.20E-06	2.39E-03
ZN-69	55.6 M	2.32E-08	5.88E-04	5.88E-04
ZN-69M	13.76 H	1.62E-03	4.93E-05	1.67E-03
GA-66	9.40 H	1.07E-02	2.26E-03	1.29E-02
GA-67	3.261 D	5.65E-04	2.55E-06	5.67E-04
GA-68	68.0 M	3.75E-03	1.62E-03	5.37E-03
GA-72	14.1 H	1.17E-02	1.03E-03	1.27E-02
GE-68	288 D	3.70E-06	0.0	3.70E-06
GE-71	11.8 D	3.74E-06	0.0	3.74E-06
GE-77	11.30 H	4.25E-03	1.39E-03	5.64E-03
AS-72	26.0 H	7.22E-03	2.35E-03	9.58E-03
AS-73	80.30 D	3.09E-05	0.0	3.09E-05
AS-74	17.77 D	3.04E-03	5.30E-04	3.57E-03
AS-76	26.32 H	1.73E-03	2.42E-03	4.15E-03
AS-77	38.8 H	3.33E-05	3.70E-04	4.03E-04
SE-73	7.15 H	4.28E-03	7.85E-04	5.07E-03
SE-75	119.78 D	1.49E-03	4.86E-06	1.50E-03
SE-79	6.5E4 Y	0.0	8.36E-06	8.36E-06
BR-77	57.04 H	1.24E-03	3.72E-06	1.25E-03
BR-80	17.4 M	2.98E-04	1.58E-03	1.88E-03
BR-80M	4.42 H	5.70E-05	0.0	5.70E-05
BR-82	35.30 H	1.08E-02	1.60E-04	1.09E-02
BR-83	2.39 H	2.94E-05	5.87E-04	6.16E-04
BR-84	31.80 M	7.77E-03	2.89E-03	1.07E-02
BR-85	172 S	2.74E-04	2.26E-03	2.53E-03
KR-79	35.04 H	9.96E-04	3.21E-05	1.03E-03

DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
KR-81	2.1E5 Y	4.51E-05	0.0	4.51E-05
KR-83M	1.83 H	2.96E-06	0.0	2.96E-06
KR-85	10.72 Y	8.78E-06	4.35E-04	4.44E-04
KR-85M	4.48 H	6.09E-04	4.53E-04	1.06E-03
KR-87	76.3 M	3.41E-03	3.06E-03	6.47E-03
KR-88	2.84 H	8.63E-03	7.03E-04	9.34E-03
KR-89	3.16 M	7.79E-03	3.17E-03	1.10E-02
KR-90	32.32 S	5.24E-03	3.01E-03	8.26E-03
RB-81	4.58 H	2.38E-03	3.77E-04	2.76E-03
RB-82	1.25 M	4.33E-03	3.25E-03	7.58E-03
RB-83	86.2 D	1.98E-03	0.0	1.98E-03
RB-84	32.9 D	3.66E-03	3.37E-04	4.00E-03
RB-86	18.66 D	3.91E-04	1.45E-03	1.84E-03
RB-87	4.73E10 Y	0.0	4.69E-05	4.69E-05
RB-88	17.8 M	2.76E-03	5.00E-03	7.75E-03
RB-89	15.44 M	8.82E-03	2.31E-03	1.11E-02
RB-90	157 S	9.46E-03	4.71E-03	1.42E-02
RB-90M	258 S	1.41E-02	3.24E-03	1.74E-02
SR-82	25.0 D	1.01E-05	0.0	1.01E-05
SR-85	64.84 D	2.02E-03	7.26E-06	2.03E-03
SR-85M	67.66 M	8.23E-04	9.54E-06	8.33E-04
SR-87M	2.805 H	1.24E-03	1.42E-04	1.38E-03
SR-89	50.55 D	5.67E-07	1.25E-03	1.25E-03
SR-90	28.6 Y	0.0	3.05E-04	3.05E-04
SR-91	9.5 H	2.83E-03	1.41E-03	4.24E-03
SR-92	2.71 H	5.43E-03	3.06E-04	5.74E-03
SR-93	7.3 M	9.28E-03	2.01E-03	1.13E-02
Y-86	14.74 H	1.49E-02	4.80E-04	1.54E-02
Y-87	80.3 H	1.80E-03	3.00E-06	1.80E-03
Y-88	106.60 D	1.15E-02	1.48E-06	1.15E-02
Y-90	64.1 H	0.0	2.11E-03	2.11E-03
Y-90M	3.19 H	2.46E-03	1.01E-04	2.56E-03
Y-91	58.51 D	1.48E-05	1.29E-03	1.31E-03
Y-91M	49.71 M	2.10E-03	6.30E-05	2.17E-03
Y-92	3.54 H	1.04E-03	3.39E-03	4.43E-03
Y-93	10.1 H	3.72E-04	2.71E-03	3.08E-03
ZR-86	16.5 H	1.08E-03	1.67E-05	1.10E-03
ZR-88	83.4 D	1.49E-03	2.21E-05	1.51E-03
ZR-89	78.43 H	4.75E-03	1.94E-04	4.94E-03
ZR-93	1.53E6 Y	0.0	0.0	0.0
ZR-95	64.02 D	3.00E-03	1.18E-04	3.11E-03
ZR-97	16.90 H	7.36E-04	1.50E-03	2.24E-03
NB-90	14.60 H	1.80E-02	7.82E-04	1.88E-02
NB-91	1E4 Y	2.19E-05	1.24E-07	2.20E-05
NB-91M	61 D	1.88E-04	1.41E-05	2.02E-04
NB-92	3.6E7 Y	6.12E-03	3.35E-06	6.13E-03
NB-92M	10.15 D	4.00E-03	0.0	4.00E-03
NB-93M	14.6 Y	3.00E-06	0.0	3.00E-06
NB-94	2.03E4 Y	6.46E-03	1.83E-04	6.64E-03

DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
NB-94M	6.26 M	2.86E-05	4.16E-06	3.27E-05
NB-95	35.06 D	3.13E-03	7.52E-06	3.13E-03
NB-95M	86.6 H	2.37E-04	3.12E-04	5.49E-04
NB-96	23.35 H	1.01E-02	4.24E-04	1.05E-02
NB-97	72.1 M	2.68E-03	9.41E-04	3.62E-03
NB-97M	60 S	2.97E-03	3.50E-05	3.00E-03
MO-91	15.49 M	3.86E-03	3.37E-03	7.23E-03
MO-93	3.5E3 Y	1.68E-05	0.0	1.68E-05
MO-99	66.02 H	6.26E-04	7.65E-04	1.39E-03
MO-101	14.61 M	6.20E-03	1.08E-03	7.27E-03
TC-95	20.0 H	3.23E-03	2.20E-06	3.23E-03
TC-95M	61 D	2.69E-03	1.18E-05	2.70E-03
TC-96	4.28 D	1.03E-02	2.31E-06	1.03E-02
TC-96M	51.5 M	1.80E-04	0.0	1.80E-04
TC-97	2.6E6 Y	1.93E-05	0.0	1.93E-05
TC-97M	89 D	1.72E-05	6.59E-06	2.38E-05
TC-98	4.2E6 Y	5.65E-03	1.28E-04	5.78E-03
TC-99	2.13E5 Y	2.06E-09	5.70E-05	5.70E-05
TC-99M	6.02 H	4.90E-04	9.33E-06	4.99E-04
TC-101	14.2 M	1.33E-03	9.53E-04	2.28E-03
RU-97	2.9 D	8.92E-04	1.09E-05	9.03E-04
RU-103	39.35 D	1.90E-03	4.07E-05	1.94E-03
RU-105	4.44 H	3.15E-03	7.84E-04	3.93E-03
RU-106	368.2 D	0.0	0.0	0.0
RH-103M	56.119 M	3.12E-06	0.0	3.12E-06
RH-105	35.36 H	2.99E-04	2.03E-04	5.01E-04
RH-105M	45 S	1.20E-04	5.75E-05	1.77E-04
RH-106	29.92 S	8.27E-04	3.27E-03	4.10E-03
PD-103	16.961 D	2.75E-05	0.0	2.75E-05
PD-107	6.5E6 Y	0.0	0.0	0.0
PD-109	13.453 H	2.71E-06	6.84E-04	6.87E-04
AG-106M	8.46 D	1.14E-02	6.66E-06	1.14E-02
AG-108	2.37 M	7.01E-05	1.29E-03	1.36E-03
AG-108M	127 Y	6.44E-03	1.31E-05	6.46E-03
AG-109M	39.6 S	2.93E-05	2.83E-06	3.21E-05
AG-110	24.57 S	1.23E-04	2.70E-03	2.82E-03
AG-110M	249.85 D	1.12E-02	7.30E-05	1.12E-02
AG-111	7.46 D	1.02E-04	6.60E-04	7.61E-04
CD-109	464 D	3.06E-05	0.0	3.06E-05
CD-111M	48.7 M	1.08E-03	1.03E-04	1.18E-03
CD-113	9.3E15 Y	0.0	7.27E-05	7.27E-05
CD-113M	13.7 Y	0.0	2.70E-04	2.70E-04
CD-115	53.46 H	8.03E-04	5.71E-04	1.37E-03
CD-115M	44.6 D	9.02E-05	1.28E-03	1.37E-03
CD-117	2.49 H	4.44E-03	8.59E-04	5.30E-03
CD-117M	3.36 H	8.72E-03	3.17E-04	9.04E-03
IN-111	2.83 D	1.52E-03	3.87E-05	1.55E-03
IN-113M	1.658 H	9.96E-04	2.81E-04	1.28E-03
IN-114	71.9 S	1.27E-04	1.68E-03	1.81E-03

DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER IN SV/YR PER BQ/(CUBIC CM)

VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
IN-114M	49.51 D	3.68E-04	1.92E-04	5.61E-04
IN-115	4.6E15 Y	0.0	1.95E-04	1.95E-04
IN-115M	4.36 H	6.25E-04	3.39E-04	9.64E-04
IN-116M	54.15 M	1.02E-02	5.45E-04	1.07E-02
IN-117	43.8 M	2.72E-03	4.31E-04	3.15E-03
IN-117M	116.5 M	3.46E-04	9.04E-04	1.25E-03
SN-113	115.1 D	5.94E-05	0.0	5.94E-05
SN-117M	13.60 D	5.83E-04	1.38E-04	7.20E-04
SN-119M	293.0 D	2.53E-05	0.0	2.53E-05
SN-123	129.2 D	2.85E-05	1.11E-03	1.14E-03
SN-125	9.64 D	1.27E-03	1.82E-03	3.09E-03
SN-126	1.0E5 Y	2.08E-04	3.44E-05	2.42E-04
SB-117	2.80 H	6.87E-04	2.30E-05	7.10E-04
SB-122	2.70 D	1.77E-03	1.19E-03	2.96E-03
SB-124	60.20 D	7.74E-03	7.45E-04	8.49E-03
SB-125	2.77 Y	1.69E-03	9.08E-05	1.78E-03
SB-126	12.4 D	1.11E-02	5.58E-04	1.16E-02
SB-126M	19.0 M	6.30E-03	1.27E-03	7.56E-03
SB-127	3.85 D	2.65E-03	5.73E-04	3.22E-03
SB-129	4.40 H	5.89E-03	6.85E-04	6.58E-03
TE-121	16.8 D	2.26E-03	6.10E-06	2.26E-03
TE-121M	154 D	8.17E-04	2.00E-05	8.37E-04
TE-123	1E13 Y	3.14E-05	0.0	3.14E-05
TE-123M	119.7 D	5.53E-04	2.05E-05	5.73E-04
TE-125M	58 D	8.90E-05	2.02E-05	1.09E-04
TE-127	9.35 H	1.87E-05	3.58E-04	3.77E-04
TE-127M	109 D	2.83E-05	1.09E-05	3.93E-05
TE-129	69.6 M	2.20E-04	1.08E-03	1.30E-03
TE-129M	33.6 D	1.47E-04	4.68E-04	6.15E-04
TE-131	25.0 M	1.67E-03	1.52E-03	3.19E-03
TE-131M	30 H	5.84E-03	2.67E-04	6.11E-03
TE-132	78.2 H	8.55E-04	4.80E-05	9.03E-04
TE-133	12.45 M	3.75E-03	1.81E-03	5.56E-03
TE-133M	55.4 M	9.16E-03	1.51E-03	1.07E-02
TE-134	41.8 M	3.47E-03	1.38E-04	3.61E-03
I-122	3.62 M	3.85E-03	2.38E-03	6.23E-03
I-123	13.13 H	6.36E-04	1.76E-05	6.54E-04
I-124	4.18 D	4.31E-03	4.35E-04	4.74E-03
I-125	60.14 D	1.05E-04	0.0	1.05E-04
I-126	12.93 D	1.84E-03	2.45E-04	2.08E-03
I-128	24.99 M	2.95E-04	1.67E-03	1.96E-03
I-129	1.57E7 Y	6.77E-05	3.70E-06	7.13E-05
I-130	12.36 H	8.59E-03	5.10E-04	9.10E-03
I-131	8.040 D	1.48E-03	2.77E-04	1.76E-03
I-132	2.30 H	9.34E-03	9.99E-04	1.03E-02
I-133	20.8 H	2.42E-03	8.04E-04	3.22E-03
I-134	52.6 M	1.08E-02	1.29E-03	1.21E-02
I-135	6.61 H	6.53E-03	7.09E-04	7.23E-03
I-136	83 S	1.08E-02	4.84E-03	1.56E-02

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VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
XE-122	20.1 H	2.66E-04	2.01E-06	2.68E-04
XE-123	2.14 H	2.51E-03	3.43E-04	2.85E-03
XE-125	16.8 H	1.00E-03	2.55E-05	1.03E-03
XE-127	36.406 D	1.04E-03	2.84E-05	1.06E-03
XE-129M	8.89 D	1.50E-04	2.23E-04	3.73E-04
XE-131M	11.84 D	5.73E-05	1.37E-04	1.95E-04
XE-133	5.245 D	1.62E-04	8.65E-05	2.48E-04
XE-133M	2.19 D	1.38E-04	3.06E-04	4.44E-04
XE-135	9.11 H	9.47E-04	5.72E-04	1.52E-03
XE-135M	15.36 M	1.69E-03	2.21E-04	1.92E-03
XE-137	3.83 M	7.45E-04	4.19E-03	4.94E-03
XE-138	14.13 M	4.82E-03	1.33E-03	6.15E-03
CS-126	1.64 M	4.45E-03	3.12E-03	7.57E-03
CS-129	32.06 H	1.06E-03	6.95E-06	1.07E-03
CS-131	9.688 D	6.11E-05	0.0	6.11E-05
CS-132	6.475 D	2.85E-03	1.40E-05	2.87E-03
CS-134	2.062 Y	6.30E-03	2.46E-04	6.54E-03
CS-134M	2.90 H	9.26E-05	5.01E-05	1.43E-04
CS-135	2.3E6 Y	0.0	1.63E-05	1.63E-05
CS-136	13.16 D	8.87E-03	1.23E-04	8.99E-03
CS-137	30.17 Y	0.0	2.39E-04	2.39E-04
CS-138	32.2 M	9.88E-03	2.80E-03	1.27E-02
CS-139	9.40 M	1.29E-03	3.90E-03	5.19E-03
BA-131	11.8 D	1.82E-03	2.18E-05	1.84E-03
BA-133	10.5 Y	1.47E-03	1.62E-05	1.49E-03
BA-133M	38.9 H	2.41E-04	3.77E-04	6.17E-04
BA-135M	28.7 H	2.15E-04	3.67E-04	5.82E-04
BA-137M	2.552 M	2.40E-03	1.52E-04	2.56E-03
BA-139	83.1 M	1.36E-04	1.99E-03	2.13E-03
BA-140	12.789 D	7.42E-04	4.91E-04	1.23E-03
BA-141	18.27 M	3.56E-03	1.88E-03	5.44E-03
BA-142	10.70 M	3.68E-03	9.10E-04	4.59E-03
LA-140	40.22 H	9.57E-03	1.10E-03	1.07E-02
LA-141	3.94 H	1.74E-04	2.12E-03	2.29E-03
LA-142	95.4 M	1.19E-02	1.89E-03	1.38E-02
CE-139	137.66 D	5.94E-04	2.23E-05	6.17E-04
CE-141	32.50 D	2.94E-04	1.91E-04	4.85E-04
CE-143	33.0 H	1.05E-03	8.16E-04	1.87E-03
CE-144	284.3 D	7.25E-05	5.83E-05	1.31E-04
PR-142	19.13 H	2.41E-04	1.83E-03	2.07E-03
PR-143	13.56 D	3.63E-11	5.77E-04	5.77E-04
PR-144	17.28 M	1.38E-04	2.77E-03	2.90E-03
PR-144M	7.2 M	3.57E-05	0.0	3.57E-05
ND-147	10.98 D	5.42E-04	3.89E-04	9.31E-04
ND-149	1.73 H	1.48E-03	9.26E-04	2.41E-03
PM-143	265 D	1.25E-03	2.40E-06	1.25E-03
PM-144	363 D	6.21E-03	1.90E-05	6.23E-03
PM-145	17.7 Y	1.03E-04	8.81E-11	1.03E-04
PM-146	2020 D	3.00E-03	1.63E-04	3.16E-03

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VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
PM-147	2.6234 Y	1.36E-08	2.31E-05	2.31E-05
PM-148	5.37 D	2.33E-03	1.58E-03	3.91E-03
PM-148M	41.3 D	8.00E-03	2.15E-04	8.21E-03
PM-149	53.08 H	4.50E-05	6.95E-04	7.40E-04
PM-151	28.40 H	1.31E-03	5.05E-04	1.81E-03
SM-147	1.069E11 Y	0.0	0.0	0.0
SM-151	90 Y	1.60E-08	0.0	1.60E-08
SM-153	46.7 H	2.28E-04	3.61E-04	5.89E-04
EU-152	13.6 Y	4.66E-03	1.71E-04	4.83E-03
EU-152M	9.32 H	1.29E-03	1.05E-03	2.34E-03
EU-154	8.8 Y	5.12E-03	3.96E-04	5.51E-03
EU-155	4.96 Y	2.34E-04	9.09E-06	2.43E-04
EU-156	15.19 D	5.71E-03	7.77E-04	6.49E-03
GD-152	1.1E14 Y	0.0	0.0	0.0
GD-153	241.6 D	4.05E-04	1.57E-06	4.06E-04
GD-159	18.56 H	1.53E-04	5.68E-04	7.22E-04
GD-162	9.7 M	1.64E-03	5.98E-04	2.24E-03
TB-157	150 Y	1.49E-05	0.0	1.49E-05
TB-160	72.3 D	4.43E-03	3.74E-04	4.80E-03
TB-162	7.76 M	4.45E-03	9.96E-04	5.45E-03
DY-157	8.06 H	1.34E-03	6.76E-06	1.35E-03
DY-165	2.334 H	1.00E-04	8.79E-04	9.80E-04
DY-166	81.6 H	1.48E-04	1.24E-04	2.71E-04
HO-166	26.80 H	1.15E-04	1.46E-03	1.58E-03
HO-166M	1.20E3 Y	6.43E-03	1.05E-04	6.53E-03
ER-169	9.40 D	1.67E-08	8.47E-05	8.47E-05
ER-171	7.52 H	1.43E-03	6.98E-04	2.13E-03
TM-170	128.6 D	2.03E-05	5.77E-04	5.98E-04
TM-171	1.92 Y	2.53E-06	4.59E-08	2.58E-06
YB-169	31.97 D	1.18E-03	5.02E-05	1.23E-03
YB-175	4.19 D	1.52E-04	1.50E-04	3.02E-04
LU-177	6.71 D	1.34E-04	1.64E-04	2.98E-04
LU-177M	160.10 D	3.81E-03	1.36E-04	3.94E-03
HF-181	42.39 D	2.12E-03	1.78E-04	2.30E-03
TA-182	114.74 D	5.28E-03	1.56E-04	5.44E-03
W-181	120.95 D	1.52E-04	0.0	1.52E-04
W-185	75.1 D	1.03E-07	1.40E-04	1.41E-04
W-187	23.83 H	1.90E-03	4.75E-04	2.38E-03
W-188	69.4 D	6.73E-06	8.49E-05	9.16E-05
RE-182	64.0 H	7.03E-03	7.40E-05	7.11E-03
RE-182M	12.7 H	4.90E-03	3.93E-05	4.94E-03
RE-183	70 D	5.91E-04	1.94E-05	6.11E-04
RE-184	38.0 D	3.66E-03	1.94E-05	3.68E-03
RE-184M	169 D	1.55E-03	2.14E-05	1.57E-03
RE-186	90.64 H	7.97E-05	6.22E-04	7.02E-04
RE-187	4.7E10 Y	0.0	0.0	0.0
RE-188	16.98 H	2.30E-04	1.68E-03	1.91E-03
OS-185	93.6 D	2.84E-03	1.32E-05	2.86E-03
OS-186	2.0E15 Y	0.0	0.0	0.0

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VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
OS-190M	9.9 M	6.24E-03	1.19E-04	6.35E-03
OS-191	15.4 D	2.81E-04	1.42E-05	2.95E-04
OS-191M	13.03 H	1.96E-05	1.16E-08	1.96E-05
OS-193	30.0 H	2.62E-04	6.58E-04	9.20E-04
IR-190	11.78 D	5.52E-03	7.71E-05	5.60E-03
IR-190M	1.2 H	1.86E-06	0.0	1.86E-06
IR-190M	3.2 H	1.86E-04	5.30E-06	1.91E-04
IR-192	74.02 D	3.18E-03	3.29E-04	3.51E-03
IR-193M	11.9 D	3.11E-06	3.11E-07	3.42E-06
IR-194	19.15 H	3.60E-04	1.79E-03	2.15E-03
IR-194M	171 D	9.22E-03	1.60E-04	9.38E-03
PT-191	2.71 D	1.13E-03	2.97E-05	1.16E-03
PT-193	50 Y	1.81E-06	0.0	1.81E-06
PT-193M	4.33 D	4.34E-05	7.90E-05	1.22E-04
PT-195M	4.02 D	2.78E-04	7.03E-05	3.48E-04
PT-197	18.3 H	9.17E-05	3.00E-04	3.92E-04
PT-197M	94.4 M	3.14E-04	5.29E-04	8.43E-04
AU-194	39.5 H	4.43E-03	5.34E-05	4.48E-03
AU-195	183 D	3.24E-04	2.10E-06	3.26E-04
AU-195M	30.6 S	7.62E-04	9.09E-05	8.53E-04
AU-196	6.183 D	1.83E-03	4.62E-05	1.88E-03
AU-198	2.696 D	1.57E-03	6.02E-04	2.17E-03
AU-199	3.139 D	3.42E-04	1.09E-04	4.50E-04
HG-197	64.14 H	2.66E-04	3.22E-07	2.66E-04
HG-197M	23.8 H	3.55E-04	1.79E-04	5.34E-04
HG-203	46.60 D	8.75E-04	9.82E-05	9.73E-04
TL-200	26.1 H	5.29E-03	5.14E-05	5.34E-03
TL-201	73.06 H	3.56E-04	8.51E-06	3.65E-04
TL-202	12.23 D	1.82E-03	2.83E-05	1.85E-03
TL-204	3.779 Y	4.30E-06	4.51E-04	4.55E-04
TL-207	4.77 M	9.00E-06	1.01E-03	1.02E-03
TL-208	3.053 M	1.49E-02	1.24E-03	1.62E-02
TL-209	2.20 M	8.62E-03	1.46E-03	1.01E-02
TL-210	1.30 M	1.16E-02	1.48E-03	1.30E-02
PB-203	52.02 H	1.17E-03	8.31E-05	1.25E-03
PB-204M	66.9 M	8.55E-03	2.36E-04	8.79E-03
PB-205	1.51E7 Y	2.30E-06	0.0	2.30E-06
PB-209	3.253 H	0.0	3.00E-04	3.00E-04
PB-210	22.26 Y	9.52E-06	0.0	9.52E-06
PB-211	36.1 M	2.05E-04	9.16E-04	1.12E-03
PB-212	10.643 H	5.65E-04	1.78E-04	7.43E-04
PB-214	26.8 M	9.61E-04	4.63E-04	1.42E-03
BI-206	6.243 D	1.35E-02	1.95E-04	1.36E-02
BI-207	33.4 Y	6.28E-03	2.60E-04	6.54E-03
BI-208	3.68E5 Y	1.20E-02	1.06E-05	1.20E-02
BI-210	5.013 D	0.0	7.56E-04	7.56E-04
BI-211	2.13 M	1.83E-04	1.86E-05	2.02E-04
BI-212	60.55 M	7.53E-04	1.01E-03	1.76E-03
BI-213	45.65 M	5.43E-04	8.78E-04	1.42E-03

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VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
BI-214	19.9 M	6.31E-03	1.39E-03	7.70E-03
PO-209	102 Y	1.40E-05	3.03E-07	1.43E-05
PO-210	138.378 D	3.50E-08	0.0	3.50E-08
PO-211	0.516 S	3.17E-05	0.0	3.17E-05
PO-212	2.98E-7 S	0.0	0.0	0.0
PO-213	4.2E-6 S	1.25E-07	0.0	1.25E-07
PO-214	1.637E-4 S	3.43E-07	0.0	3.43E-07
PO-215	1.778E-3 S	5.80E-07	0.0	5.80E-07
PO-216	0.146 S	5.96E-08	0.0	5.96E-08
PO-218	3.05 M	0.0	0.0	0.0
AT-211	7.214 H	1.50E-04	0.0	1.50E-04
AT-217	0.0323 S	9.48E-07	0.0	9.48E-07
RN-218	0.035 S	3.02E-06	0.0	3.02E-06
RN-219	3.96 S	2.20E-04	1.02E-05	2.31E-04
RN-220	55.61 S	2.07E-06	0.0	2.07E-06
RN-222	3.8235 D	1.53E-06	0.0	1.53E-06
FR-221	4.8 M	1.17E-04	1.13E-05	1.29E-04
FR-223	21.8 M	1.98E-04	6.53E-04	8.51E-04
RA-222	38.0 S	3.54E-05	1.32E-06	3.67E-05
RA-223	11.434 D	5.19E-04	6.02E-05	5.79E-04
RA-224	3.62 D	3.81E-05	3.28E-06	4.14E-05
RA-225	14.8 D	4.35E-05	7.46E-05	1.18E-04
RA-226	1600 Y	2.56E-05	3.87E-06	2.95E-05
RA-228	5.75 Y	2.60E-12	0.0	2.60E-12
AC-225	10.0 D	5.43E-05	6.37E-07	5.50E-05
AC-227	21.773 Y	6.40E-07	0.0	6.40E-07
AC-228	6.13 H	3.80E-03	7.33E-04	4.53E-03
TH-226	30.9 M	3.07E-05	4.41E-06	3.51E-05
TH-227	18.718 D	4.06E-04	1.73E-05	4.24E-04
TH-228	1.9132 Y	8.80E-06	1.53E-07	8.96E-06
TH-229	7.34E3 Y	3.43E-04	2.12E-05	3.65E-04
TH-230	7.7E4 Y	2.66E-06	0.0	2.66E-06
TH-231	25.52 H	6.17E-05	4.86E-05	1.10E-04
TH-232	1.405E10 Y	1.85E-06	4.46E-08	1.89E-06
TH-233	22.3 M	1.35E-04	7.89E-04	9.23E-04
TH-234	24.10 D	3.25E-05	8.35E-06	4.09E-05
PA-230	17.4 D	2.69E-03	3.42E-05	2.72E-03
PA-231	3.276E4 Y	1.25E-04	9.43E-06	1.34E-04
PA-233	27.0 D	8.25E-04	1.95E-04	1.02E-03
PA-234	6.70 H	8.01E-03	5.85E-04	8.59E-03
PA-234M	1.17 M	4.72E-05	1.83E-03	1.88E-03
U-230	20.8 D	6.04E-06	1.73E-07	6.21E-06
U-231	4.2 D	2.84E-04	8.43E-08	2.84E-04
U-232	72 Y	2.77E-06	8.54E-08	2.86E-06
U-233	1.592E5 Y	1.45E-06	1.37E-09	1.45E-06
U-234	2.445E5 Y	2.11E-06	4.17E-08	2.15E-06
U-235	7.038E8 Y	5.76E-04	6.01E-06	5.82E-04
U-236	2.3415E7 Y	1.90E-06	2.30E-08	1.92E-06
U-237	6.75 D	5.34E-04	8.38E-05	6.18E-04

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NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
U-238	4.468E9 Y	1.67E-06	1.53E-08	1.68E-06
U-239	23.40 M	1.93E-04	7.77E-04	9.70E-04
U-240	14.1 H	1.04E-05	1.38E-04	1.49E-04
NP-235	396.1 D	1.34E-05	4.47E-11	1.34E-05
NP-236	1.15E6 Y	5.16E-04	8.47E-05	6.00E-04
NP-236M	22.5 H	2.02E-04	9.97E-05	3.02E-04
NP-237	2.14E6 Y	1.04E-04	1.43E-06	1.05E-04
NP-238	2.117 D	2.29E-03	3.96E-04	2.69E-03
NP-239	2.355 D	6.46E-04	2.15E-04	8.60E-04
NP-240	65 M	4.68E-03	5.18E-04	5.20E-03
NP-240M	7.4 M	1.33E-03	1.27E-03	2.60E-03
PU-236	2.851 Y	2.47E-06	0.0	2.47E-06
PU-237	45.3 D	1.93E-04	2.39E-09	1.93E-04
PU-238	87.75 Y	2.12E-06	0.0	2.12E-06
PU-239	24131 Y	9.81E-07	0.0	9.81E-07
PU-240	6537 Y	2.03E-06	0.0	2.03E-06
PU-241	14.4 Y	0.0	0.0	0.0
PU-242	3.758E5 Y	1.69E-06	0.0	1.69E-06
PU-243	4.956 H	9.40E-05	2.18E-04	3.12E-04
PU-244	8.26E7 Y	1.43E-06	0.0	1.43E-06
PU-245	10.57 H	1.67E-03	5.47E-04	2.21E-03
PU-246	10.85 D	3.77E-04	2.17E-05	3.99E-04
AM-241	432.2 Y	9.36E-05	1.84E-08	9.36E-05
AM-242	16.02 H	5.80E-05	2.39E-04	2.97E-04
AM-242M	152 Y	7.12E-06	0.0	7.12E-06
AM-243	7.38E3 Y	2.17E-04	2.43E-09	2.17E-04
AM-244	10.1 H	3.28E-03	2.64E-04	3.54E-03
AM-245	122.4 M	1.20E-04	4.74E-04	5.95E-04
AM-246	25.0 M	4.03E-03	8.68E-04	4.90E-03
CM-242	163.2 D	2.31E-06	0.0	2.31E-06
CM-243	28.5 Y	4.92E-04	9.33E-05	5.85E-04
CM-244	18.11 Y	2.04E-06	0.0	2.04E-06
CM-245	8.5E3 Y	2.79E-04	2.98E-05	3.08E-04
CM-246	4.75E3 Y	1.81E-06	0.0	1.81E-06
CM-247	1.56E7 Y	1.23E-03	1.88E-05	1.24E-03
CM-248	3.39E5 Y	1.45E-06	0.0	1.45E-06
CM-249	64.15 M	7.49E-05	4.79E-04	5.54E-04
CM-250	6.9E3 Y	0.0	0.0	0.0
BK-249	320 D	0.0	1.10E-06	1.10E-06
BK-250	3.222 H	3.68E-03	4.99E-04	4.18E-03
BK-251	57.0 M	0.0	6.91E-04	6.91E-04
CF-248	333.5 D	1.69E-06	0.0	1.69E-06
CF-249	350.6 Y	1.27E-03	2.16E-05	1.29E-03
CF-250	13.08 Y	1.74E-06	6.21E-10	1.74E-06
CF-251	9.0E2 Y	4.52E-04	1.54E-04	6.05E-04
CF-252	2.639 Y	1.61E-06	8.50E-10	1.61E-06
CF-253	17.81 D	2.85E-08	4.85E-05	4.86E-05
CF-254	60.5 D	7.40E-11	0.0	7.40E-11
ES-253	20.467 D	2.11E-06	0.0	2.11E-06

DOSE-RATE CONVERSION FACTORS FOR SKIN FOR IMMERSION IN CONTAMINATED WATER
IN SV/YR PER BQ/(CUBIC CM)

VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
ES-254	275.7 D	3.24E-05	3.98E-09	3.24E-05
ES-254M	39.3 H	2.26E-03	2.68E-04	2.53E-03
ES-255	39.8 D	1.27E-07	4.15E-05	4.16E-05
FM-254	3.240 H	1.95E-06	3.30E-08	1.99E-06
FM-255	20.07 H	2.05E-05	1.22E-07	2.06E-05
FM-256	157.6 M	0.0	0.0	0.0

DOSE-RATE CONVERSION FACTORS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE

DOSE RATE AT BODY SURFACE FOR GROUND-SURFACE CONCENTRATION OF 1 BQ PER SQUARE CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
H-3	12.28 Y	0.0	0.0	0.0
BE-7	53.44 D	2.39E-05	0.0	2.39E-05
BE-10	1.6E6 Y	0.0	6.29E-05	6.29E-05
C-11	20.48 M	4.86E-04	1.09E-03	1.57E-03
C-14	5.73E3 Y	0.0	0.0	0.0
N-13	9.97 M	4.86E-04	1.78E-03	2.27E-03
N-16	7.13 S	1.18E-03	5.86E-03	7.04E-03
O-15	122.24 S	4.87E-04	2.98E-03	3.47E-03
F-18	109.74 M	4.71E-04	1.92E-04	6.63E-04
NA-22	2.602 Y	9.57E-04	5.98E-05	1.02E-03
NA-24	15.00 H	1.44E-03	2.13E-03	3.57E-03
MG-27	9.458 M	3.93E-04	2.81E-03	3.20E-03
MG-28	20.91 H	5.92E-04	6.36E-06	5.98E-04
AL-26	7.2E5 Y	1.08E-03	1.44E-03	2.52E-03
AL-28	2.240 M	6.63E-04	4.35E-03	5.02E-03
SI-31	157.3 M	3.61E-07	2.34E-03	2.34E-03
SI-32	3.3E2 Y	0.0	0.0	0.0
P-32	14.29 D	0.0	2.78E-03	2.78E-03
P-33	25.4 D	0.0	0.0	0.0
S-35	87.44 D	0.0	0.0	0.0
CL-36	3.01E5 Y	3.55E-09	2.97E-04	2.97E-04
CL-38	37.21 M	5.38E-04	4.11E-03	4.64E-03
AR-37	35.02 D	5.27E-07	0.0	5.27E-07
AR-39	269 Y	0.0	1.10E-04	1.10E-04
AR-41	1.827 H	5.21E-04	1.62E-03	2.14E-03
K-40	1.277E9 Y	6.14E-05	1.69E-03	1.75E-03
K-42	12.36 H	1.08E-04	4.55E-03	4.65E-03
K-43	22.6 H	4.60E-04	6.32E-04	1.09E-03
CA-41	1.03E5 Y	1.09E-06	0.0	1.09E-06
CA-45	162.7 D	2.46E-12	0.0	2.46E-12
CA-47	4.536 D	4.36E-04	7.90E-04	1.23E-03
CA-49	8.719 M	9.88E-04	3.36E-03	4.35E-03
SC-44	3.927 H	9.48E-04	2.41E-03	3.36E-03
SC-46	83.80 D	8.64E-04	8.15E-08	8.64E-04
SC-46M	18.72 S	4.51E-05	0.0	4.51E-05
SC-47	3.422 D	5.37E-05	3.45E-05	8.83E-05
SC-48	43.67 H	1.41E-03	1.72E-04	1.58E-03
SC-49	57.4 M	3.91E-07	3.25E-03	3.25E-03
TI-44	47.3 Y	7.73E-05	0.0	7.73E-05
TI-45	3.08 H	4.15E-04	1.21E-03	1.63E-03
TI-51	5.752 M	1.78E-04	3.37E-03	3.55E-03
V-48	15.971 D	1.24E-03	1.90E-04	1.43E-03
V-49	330 D	2.90E-06	0.0	2.90E-06
V-52	3.75 M	5.72E-04	3.94E-03	4.51E-03
CR-49	42.09 M	5.03E-04	2.40E-03	2.90E-03
CR-51	27.704 D	1.94E-05	0.0	1.94E-05
MN-52	5.591 D	1.48E-03	3.39E-05	1.51E-03
MN-52M	21.4 M	1.03E-03	4.13E-03	5.17E-03
MN-53	3.7E6 Y	5.06E-06	0.0	5.06E-06

DOSE-RATE CONVERSION FACTORS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE

DOSE RATE AT BODY SURFACE FOR GROUND-SURFACE CONCENTRATION OF 1 BQ PER SQUARE CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
MN-54	312.7 D	3.79E-04	0.0	3.79E-04
MN-56	2.5785 H	6.83E-04	2.77E-03	3.45E-03
MN-57	1.47 M	4.68E-05	4.00E-03	4.05E-03
FE-52	8.275 H	3.57E-04	3.93E-04	7.50E-04
FE-55	2.7 Y	6.49E-06	0.0	6.49E-06
FE-59	44.63 D	4.93E-04	7.51E-06	5.00E-04
CO-56	78.76 D	1.42E-03	4.79E-04	1.90E-03
CO-57	270.9 D	8.10E-05	0.0	8.10E-05
CO-58	70.80 D	4.49E-04	2.20E-06	4.51E-04
CO-58M	9.15 H	8.82E-06	0.0	8.82E-06
CO-60	5.271 Y	1.02E-03	0.0	1.02E-03
CO-60M	10.47 M	1.13E-05	5.51E-06	1.68E-05
CO-61	1.650 H	4.78E-05	1.63E-03	1.68E-03
NI-56	6.10 D	7.88E-04	0.0	7.88E-04
NI-57	36.08 H	7.92E-04	3.02E-04	1.09E-03
NI-59	7.5E4 Y	1.04E-05	0.0	1.04E-05
NI-63	100.1 Y	0.0	0.0	0.0
NI-65	2.520 H	2.22E-04	2.22E-03	2.45E-03
CU-61	3.408 H	3.93E-04	1.11E-03	1.51E-03
CU-62	9.74 M	4.80E-04	4.46E-03	4.94E-03
CU-64	12.701 H	9.54E-05	7.68E-05	1.72E-04
CU-67	61.88 D	6.00E-05	1.59E-05	7.59E-05
ZN-62	9.26 H	2.35E-04	1.33E-05	2.48E-04
ZN-65	244.4 D	2.60E-04	0.0	2.60E-04
ZN-69	55.6 M	2.92E-09	7.48E-04	7.48E-04
ZN-69M	13.76 H	2.02E-04	3.76E-05	2.40E-04
GA-66	9.40 H	9.43E-04	2.73E-03	3.67E-03
GA-67	3.261 D	9.62E-05	0.0	9.62E-05
GA-68	68.0 M	4.52E-04	2.98E-03	3.44E-03
GA-72	14.1 H	1.07E-03	1.47E-03	2.54E-03
GE-68	288 D	2.14E-05	0.0	2.14E-05
GE-71	11.8 D	2.17E-05	0.0	2.17E-05
GE-77	11.30 H	4.88E-04	2.36E-03	2.85E-03
AS-72	26.0 H	8.16E-04	3.74E-03	4.56E-03
AS-73	80.30 D	5.82E-05	0.0	5.82E-05
AS-74	17.77 D	3.70E-04	8.36E-04	1.21E-03
AS-76	26.32 H	1.93E-04	3.76E-03	3.96E-03
AS-77	38.8 H	4.21E-06	2.29E-04	2.33E-04
SE-73	7.15 H	5.46E-04	1.45E-03	2.00E-03
SE-75	119.78 D	2.22E-04	0.0	2.22E-04
SE-79	6.5E4 Y	0.0	0.0	0.0
BR-77	57.04 H	1.83E-04	0.0	1.83E-04
BR-80	17.4 M	3.69E-05	2.84E-03	2.88E-03
BR-80M	4.42 H	6.14E-05	0.0	6.14E-05
BR-82	35.30 H	1.17E-03	2.39E-06	1.17E-03
BR-83	2.39 H	3.54E-06	7.59E-04	7.62E-04
BR-84	31.80 M	6.54E-04	3.68E-03	4.33E-03
BR-85	172 S	2.88E-05	3.73E-03	3.75E-03
KR-79	35.04 H	1.53E-04	1.32E-05	1.66E-04

DOSE-RATE CONVERSION FACTORS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE

DOSE RATE AT BODY SURFACE FOR GROUND-SURFACE CONCENTRATION OF 1 BQ PER SQUARE CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
KR-81	2.1E5 Y	3.78E-05	0.0	3.78E-05
KR-83M	1.83 H	1.32E-05	0.0	1.32E-05
KR-85	10.72 Y	1.06E-06	3.40E-04	3.41E-04
KR-85M	4.48 H	8.18E-05	4.46E-04	5.28E-04
KR-87	76.3 M	3.10E-04	4.17E-03	4.48E-03
KR-88	2.84 H	7.20E-04	8.23E-04	1.54E-03
KR-89	3.16 M	7.09E-04	4.17E-03	4.88E-03
KR-90	32.32 S	5.33E-04	4.27E-03	4.80E-03
RB-81	4.58 H	3.27E-04	4.87E-04	8.14E-04
RB-82	1.25 M	5.20E-04	4.61E-03	5.13E-03
RB-83	86.2 D	2.74E-04	0.0	2.74E-04
RB-84	32.9 D	4.31E-04	5.49E-04	9.79E-04
RB-86	18.66 D	4.00E-05	2.60E-03	2.64E-03
RB-87	4.73E10 Y	0.0	0.0	0.0
RB-88	17.8 M	2.40E-04	5.28E-03	5.52E-03
RB-89	15.44 M	8.12E-04	3.33E-03	4.14E-03
RB-90	157 S	6.95E-04	4.93E-03	5.62E-03
RB-90M	258 S	1.20E-03	4.19E-03	5.40E-03
SR-82	25.0 D	3.87E-05	0.0	3.87E-05
SR-85	64.84 D	2.83E-04	1.17E-05	2.94E-04
SR-85M	67.66 M	1.13E-04	0.0	1.13E-04
SR-87M	2.805 H	1.63E-04	1.33E-05	1.76E-04
SR-89	50.55 D	6.00E-08	2.31E-03	2.31E-03
SR-90	28.6 Y	0.0	7.30E-05	7.30E-05
SR-91	9.5 H	3.02E-04	2.28E-03	2.58E-03
SR-92	2.71 H	5.39E-04	1.67E-04	7.05E-04
SR-93	7.3 M	9.50E-04	3.27E-03	4.22E-03
Y-86	14.74 H	1.54E-03	8.43E-04	2.38E-03
Y-87	80.3 H	2.59E-04	3.28E-06	2.62E-04
Y-88	106.60 D	1.09E-03	1.72E-06	1.09E-03
Y-90	64.1 H	0.0	3.54E-03	3.54E-03
Y-90M	3.19 H	3.12E-04	1.15E-04	4.27E-04
Y-91	58.51 D	1.49E-06	2.40E-03	2.40E-03
Y-91M	49.71 M	2.52E-04	1.19E-04	3.72E-04
Y-92	3.54 H	1.08E-04	4.51E-03	4.62E-03
Y-93	10.1 H	3.70E-05	4.07E-03	4.10E-03
ZR-86	16.5 H	2.11E-04	0.0	2.11E-04
ZR-88	83.4 D	2.26E-04	2.61E-06	2.29E-04
ZR-89	78.43 H	5.45E-04	2.81E-04	8.26E-04
ZR-93	1.53E6 Y	0.0	0.0	0.0
ZR-95	64.02 D	3.35E-04	8.14E-06	3.43E-04
ZR-97	16.90 H	7.78E-05	2.70E-03	2.78E-03
NB-90	14.60 H	1.63E-03	1.44E-03	3.07E-03
NB-91	1E4 Y	3.77E-05	0.0	3.77E-05
NB-91M	61 D	4.51E-05	0.0	4.51E-05
NB-92	3.6E7 Y	7.10E-04	6.35E-06	7.16E-04
NB-92M	10.15 D	4.55E-04	0.0	4.55E-04
NB-93M	14.6 Y	6.06E-06	0.0	6.06E-06
NB-94	2.03E4 Y	7.09E-04	1.21E-05	7.22E-04

DOSE-RATE CONVERSION FACTORS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE

DOSE RATE AT BODY SURFACE FOR GROUND-SURFACE CONCENTRATION OF 1 BQ PER SQUARE CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
NB-94M	6.26 M	2.46E-05	7.18E-06	3.18E-05
NB-95	35.06 D	3.47E-04	5.06E-06	3.52E-04
NB-95M	86.6 H	5.12E-05	8.64E-05	1.38E-04
NB-96	23.35 H	1.10E-03	3.48E-04	1.45E-03
NB-97	72.1 M	3.07E-04	1.66E-03	1.97E-03
NB-97M	60 S	3.32E-04	7.27E-05	4.05E-04
MO-91	15.49 M	4.66E-04	4.65E-03	5.12E-03
MO-93	3.5E3 Y	3.34E-05	0.0	3.34E-05
MO-99	66.02 H	7.27E-05	1.27E-03	1.34E-03
MO-101	14.61 M	6.31E-04	1.66E-03	2.29E-03
TC-95	20.0 H	3.87E-04	4.54E-06	3.92E-04
TC-95M	61 D	3.40E-04	1.98E-06	3.42E-04
TC-96	4.28 D	1.15E-03	4.73E-06	1.15E-03
TC-96M	51.5 M	3.48E-05	0.0	3.48E-05
TC-97	2.6E6 Y	3.25E-05	0.0	3.25E-05
TC-97M	89 D	2.35E-05	0.0	2.35E-05
TC-98	4.2E6 Y	6.40E-04	1.29E-05	6.53E-04
TC-99	2.13E5 Y	2.67E-10	0.0	2.67E-10
TC-99M	6.02 H	6.54E-05	0.0	6.54E-05
TC-101	14.2 M	1.68E-04	1.67E-03	1.83E-03
RU-97	2.9 D	1.45E-04	0.0	1.45E-04
RU-103	39.35 D	2.31E-04	1.60E-05	2.47E-04
RU-105	4.44 H	3.64E-04	1.28E-03	1.64E-03
RU-106	368.2 D	0.0	0.0	0.0
RH-103M	56.119 M	4.23E-06	0.0	4.23E-06
RH-105	35.36 H	3.84E-05	4.21E-05	8.05E-05
RH-105M	45 S	3.45E-05	0.0	3.45E-05
RH-106	29.92 S	9.60E-05	4.58E-03	4.67E-03
PD-103	16.961 D	3.60E-05	0.0	3.60E-05
PD-107	6.5E6 Y	0.0	0.0	0.0
PD-109	13.453 H	3.28E-07	1.02E-03	1.02E-03
AG-106M	8.46 D	1.27E-03	7.34E-06	1.28E-03
AG-108	2.37 M	8.86E-06	2.39E-03	2.40E-03
AG-108M	127 Y	7.81E-04	1.68E-05	7.98E-04
AG-109M	39.6 S	1.61E-05	0.0	1.61E-05
AG-110	24.57 S	1.42E-05	4.16E-03	4.17E-03
AG-110M	249.85 D	1.20E-03	1.71E-05	1.22E-03
AG-111	7.46 D	1.30E-05	9.59E-04	9.72E-04
CD-109	464 D	2.69E-05	0.0	2.69E-05
CD-111M	48.7 M	1.52E-04	0.0	1.52E-04
CD-113	9.3E15 Y	0.0	0.0	0.0
CD-113M	13.7 Y	0.0	7.30E-05	7.30E-05
CD-115	53.46 H	9.81E-05	7.77E-04	8.75E-04
CD-115M	44.6 D	9.38E-06	2.36E-03	2.37E-03
CD-117	2.49 H	4.61E-04	1.31E-03	1.77E-03
CD-117M	3.36 H	8.02E-04	2.24E-04	1.03E-03
IN-111	2.83 D	2.20E-04	0.0	2.20E-04
IN-113M	1.658 H	1.31E-04	1.97E-05	1.51E-04
IN-114	71.9 S	1.50E-05	3.03E-03	3.05E-03

DOSE-RATE CONVERSION FACTORS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE

DOSE RATE AT BODY SURFACE FOR GROUND-SURFACE CONCENTRATION OF 1 BQ PER SQUARE CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
IN-114M	49.51 D	5.34E-05	0.0	5.34E-05
IN-115	4.6E15 Y	0.0	1.26E-05	1.26E-05
IN-115M	4.36 H	8.76E-05	2.12E-05	1.09E-04
IN-116M	54.15 M	1.00E-03	7.02E-04	1.70E-03
IN-117	43.8 M	3.31E-04	3.33E-04	6.64E-04
IN-117M	116.5 M	4.90E-05	1.36E-03	1.41E-03
SN-113	115.1 D	2.46E-05	0.0	2.46E-05
SN-117M	13.60 D	8.75E-05	0.0	8.75E-05
SN-119M	293.0 D	1.36E-05	0.0	1.36E-05
SN-123	129.2 D	2.91E-06	2.05E-03	2.05E-03
SN-125	9.64 D	1.28E-04	2.99E-03	3.12E-03
SN-126	1.0E5 Y	3.59E-05	0.0	3.59E-05
SB-117	2.80 H	1.02E-04	2.09E-06	1.05E-04
SB-122	2.70 D	2.08E-04	2.13E-03	2.33E-03
SB-124	60.20 D	7.75E-04	1.06E-03	1.83E-03
SB-125	2.77 Y	2.12E-04	2.60E-05	2.38E-04
SB-126	12.4 D	1.27E-03	7.93E-04	2.06E-03
SB-126M	19.0 M	7.33E-04	2.30E-03	3.03E-03
SB-127	3.85 D	3.09E-04	7.42E-04	1.05E-03
SB-129	4.40 H	6.23E-04	9.91E-04	1.61E-03
TE-121	16.8 D	2.82E-04	1.09E-05	2.93E-04
TE-121M	154 D	1.12E-04	0.0	1.12E-04
TE-123	1E13 Y	1.28E-05	0.0	1.28E-05
TE-123M	119.7 D	7.97E-05	0.0	7.97E-05
TE-125M	58 D	3.22E-05	0.0	3.22E-05
TE-127	9.35 H	2.36E-06	2.21E-04	2.23E-04
TE-127M	109 D	1.05E-05	7.46E-06	1.80E-05
TE-129	69.6 M	2.95E-05	1.96E-03	1.99E-03
TE-129M	33.6 D	2.20E-05	8.29E-04	8.51E-04
TE-131	25.0 M	1.97E-04	2.65E-03	2.85E-03
TE-131M	30 H	6.32E-04	1.69E-04	8.02E-04
TE-132	78.2 H	1.25E-04	0.0	1.25E-04
TE-133	12.45 M	4.12E-04	3.05E-03	3.46E-03
TE-133M	55.4 M	9.72E-04	2.58E-03	3.55E-03
TE-134	41.8 M	4.16E-04	5.34E-06	4.21E-04
I-122	3.62 M	4.61E-04	3.55E-03	4.01E-03
I-123	13.13 H	9.60E-05	0.0	9.60E-05
I-124	4.18 D	4.74E-04	7.85E-04	1.26E-03
I-125	60.14 D	3.81E-05	0.0	3.81E-05
I-126	12.93 D	2.24E-04	3.36E-04	5.60E-04
I-128	24.99 M	3.69E-05	2.95E-03	2.99E-03
I-129	1.57E7 Y	2.80E-05	0.0	2.80E-05
I-130	12.36 H	9.87E-04	6.05E-04	1.59E-03
I-131	8.040 D	1.86E-04	8.63E-05	2.73E-04
I-132	2.30 H	1.03E-03	1.66E-03	2.69E-03
I-133	20.8 H	2.82E-04	1.34E-03	1.63E-03
I-134	52.6 M	1.15E-03	2.28E-03	3.43E-03
I-135	6.61 H	6.39E-04	1.11E-03	1.74E-03
I-136	83 S	9.42E-04	5.41E-03	6.35E-03

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DOSE-RATE CONVERSION FACTORS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE

DOSE RATE AT BODY SURFACE FOR GROUND-SURFACE CONCENTRATION OF 1 BQ PER SQUARE CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
XE-122	20.1 H	4.91E-05	0.0	4.91E-05
XE-123	2.14 H	2.95E-04	6.12E-04	9.07E-04
XE-125	16.8 H	1.46E-04	2.97E-07	1.46E-04
XE-127	36.406 D	1.51E-04	0.0	1.51E-04
XE-129M	8.89 D	5.36E-05	0.0	5.36E-05
XE-131M	11.84 D	2.17E-05	0.0	2.17E-05
XE-133	5.245 D	3.38E-05	0.0	3.38E-05
XE-133M	2.19 D	3.26E-05	0.0	3.26E-05
XE-135	9.11 H	1.23E-04	6.72E-04	7.95E-04
XE-135M	15.36 M	2.08E-04	3.52E-04	5.59E-04
XE-137	3.83 M	8.63E-05	5.12E-03	5.21E-03
XE-138	14.13 M	4.45E-04	2.04E-03	2.48E-03
CS-126	1.64 M	5.35E-04	4.16E-03	4.69E-03
CS-129	32.06 H	1.61E-04	2.81E-07	1.61E-04
CS-131	9.688 D	2.71E-05	0.0	2.71E-05
CS-132	6.475 D	3.47E-04	1.87E-05	3.65E-04
CS-134	2.062 Y	7.11E-04	1.38E-04	8.50E-04
CS-134M	2.90 H	2.21E-05	0.0	2.21E-05
CS-135	2.3E6 Y	0.0	0.0	0.0
CS-136	13.16 D	9.61E-04	1.89E-05	9.80E-04
CS-137	30.17 Y	0.0	9.11E-05	9.11E-05
CS-138	32.2 M	9.35E-04	4.21E-03	5.14E-03
CS-139	9.40 M	1.18E-04	4.89E-03	5.01E-03
BA-131	11.8 D	2.49E-04	6.33E-06	2.55E-04
BA-133	10.5 Y	2.20E-04	1.18E-08	2.20E-04
BA-133M	38.9 H	4.54E-05	0.0	4.54E-05
BA-135M	28.7 H	4.01E-05	0.0	4.01E-05
BA-137M	2.552 M	2.78E-04	3.20E-04	5.98E-04
BA-139	83.1 M	1.75E-05	3.43E-03	3.45E-03
BA-140	12.789 D	9.77E-05	6.26E-04	7.24E-04
BA-141	18.27 M	4.02E-04	3.12E-03	3.52E-03
BA-142	10.70 M	3.99E-04	1.46E-03	1.86E-03
LA-140	40.22 H	9.39E-04	1.96E-03	2.89E-03
LA-141	3.94 H	1.70E-05	3.55E-03	3.57E-03
LA-142	95.4 M	9.97E-04	2.98E-03	3.97E-03
CE-139	137.66 D	9.21E-05	0.0	9.21E-05
CE-141	32.50 D	4.03E-05	2.00E-05	6.03E-05
CE-143	33.0 H	1.40E-04	1.32E-03	1.46E-03
CE-144	284.3 D	1.08E-05	0.0	1.08E-05
PR-142	19.13 H	2.26E-05	3.13E-03	3.15E-03
PR-143	13.56 D	4.06E-12	7.48E-04	7.48E-04
PR-144	17.28 M	1.25E-05	4.19E-03	4.20E-03
PR-144M	7.2 M	1.07E-05	0.0	1.07E-05
ND-147	10.98 D	7.44E-05	3.57E-04	4.32E-04
ND-149	1.73 H	1.90E-04	1.55E-03	1.74E-03
PM-143	265 D	1.54E-04	5.04E-06	1.59E-04
PM-144	363 D	7.33E-04	3.33E-05	7.67E-04
PM-145	17.7 Y	2.56E-05	0.0	2.56E-05
PM-146	2020 D	3.58E-04	1.51E-04	5.09E-04

DOSE-RATE CONVERSION FACTORS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE

DOSE RATE AT BODY SURFACE FOR GROUND-SURFACE CONCENTRATION OF 1 BQ PER SQUARE CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
PM-147	2.6234 Y	1.72E-09	0.0	1.72E-09
PM-148	5.37 D	2.42E-04	2.60E-03	2.84E-03
PM-148M	41.3 D	9.23E-04	9.77E-05	1.02E-03
PM-149	53.08 H	5.70E-06	1.06E-03	1.06E-03
PM-151	28.40 H	1.67E-04	6.09E-04	7.76E-04
SM-147	1.069E11 Y	0.0	0.0	0.0
SM-151	90 Y	3.78E-08	0.0	3.78E-08
SM-153	46.7 H	4.08E-05	2.35E-04	2.76E-04
EU-152	13.6 Y	5.12E-04	2.12E-04	7.25E-04
EU-152M	9.32 H	1.44E-04	1.90E-03	2.04E-03
EU-154	8.8 Y	5.44E-04	4.48E-04	9.92E-04
EU-155	4.96 Y	3.52E-05	0.0	3.52E-05
EU-156	15.19 D	5.41E-04	1.18E-03	1.72E-03
GD-152	1.1E14 Y	0.0	0.0	0.0
GD-153	241.6 D	7.58E-05	0.0	7.58E-05
GD-159	18.56 H	2.22E-05	7.37E-04	7.59E-04
GD-162	9.7 M	2.08E-04	7.93E-04	1.00E-03
TB-157	150 Y	6.44E-06	0.0	6.44E-06
TB-160	72.3 D	4.77E-04	3.25E-04	8.02E-04
TB-162	7.76 M	5.05E-04	1.77E-03	2.27E-03
DY-157	8.06 H	1.85E-04	0.0	1.85E-04
DY-165	2.334 H	1.36E-05	1.52E-03	1.53E-03
DY-166	81.6 H	2.86E-05	7.71E-07	2.94E-05
HO-166	26.80 H	1.57E-05	2.66E-03	2.67E-03
HO-166M	1.20E3 Y	7.47E-04	8.26E-05	8.30E-04
ER-169	9.40 D	6.51E-08	6.34E-11	6.52E-08
ER-171	7.52 H	1.91E-04	1.03E-03	1.22E-03
TM-170	128.6 D	4.33E-06	7.54E-04	7.59E-04
TM-171	1.92 Y	5.50E-07	0.0	5.50E-07
YB-169	31.97 D	1.87E-04	0.0	1.87E-04
YB-175	4.19 D	2.00E-05	4.48E-06	2.45E-05
LU-177	6.71 D	1.89E-05	9.59E-06	2.85E-05
LU-177M	160.10 D	5.17E-04	6.12E-07	5.17E-04
HF-181	42.39 D	2.70E-04	1.43E-05	2.84E-04
TA-182	114.74 D	5.63E-04	1.65E-05	5.79E-04
W-181	120.95 D	3.20E-05	0.0	3.20E-05
W-185	75.1 D	1.31E-08	1.12E-06	1.13E-06
W-187	23.83 H	2.28E-04	5.30E-04	7.58E-04
W-188	69.4 D	9.14E-07	8.77E-09	9.22E-07
RE-182	64.0 H	8.08E-04	0.0	8.08E-04
RE-182M	12.7 H	5.32E-04	5.96E-05	5.92E-04
RE-183	70 D	1.07E-04	0.0	1.07E-04
RE-184	38.0 D	4.19E-04	1.52E-05	4.35E-04
RE-184M	169 D	2.05E-04	0.0	2.05E-04
RE-186	90.64 H	1.27E-05	9.03E-04	9.16E-04
RE-187	4.7E10 Y	0.0	0.0	0.0
RE-188	16.98 H	2.88E-05	2.97E-03	3.00E-03
OS-185	93.6 D	3.41E-04	2.59E-05	3.67E-04
OS-186	2.0E15 Y	0.0	0.0	0.0

DOSE-RATE CONVERSION FACTORS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE

DOSE RATE AT BODY SURFACE FOR GROUND-SURFACE CONCENTRATION OF 1 BQ PER SQUARE CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
OS-190M	9.9 M	7.73E-04	5.48E-05	8.28E-04
OS-191	15.4 D	5.76E-05	0.0	5.76E-05
OS-191M	13.03 H	1.31E-05	0.0	1.31E-05
OS-193	30.0 H	3.77E-05	9.59E-04	9.97E-04
IR-190	11.78 D	6.83E-04	2.49E-05	7.08E-04
IR-190M	1.2 H	1.09E-05	0.0	1.09E-05
IR-190M	3.2 H	3.83E-05	0.0	3.83E-05
IR-192	74.02 D	4.01E-04	1.05E-04	5.06E-04
IR-193M	11.9 D	1.08E-05	0.0	1.08E-05
IR-194	19.15 H	4.27E-05	3.09E-03	3.14E-03
IR-194M	171 D	1.12E-03	7.41E-05	1.19E-03
PT-191	2.71 D	1.69E-04	8.03E-06	1.77E-04
PT-193	50 Y	1.06E-05	0.0	1.06E-05
PT-193M	4.33 D	1.86E-05	0.0	1.86E-05
PT-195M	4.02 D	7.36E-05	0.0	7.36E-05
PT-197	18.3 H	2.25E-05	1.30E-04	1.52E-04
PT-197M	94.4 M	6.54E-05	7.52E-06	7.29E-05
AU-194	39.5 H	4.74E-04	4.22E-05	5.17E-04
AU-195	183 D	7.18E-05	0.0	7.18E-05
AU-195M	30.6 S	1.17E-04	0.0	1.17E-04
AU-196	6.183 D	2.48E-04	3.60E-08	2.48E-04
AU-198	2.696 D	1.97E-04	7.53E-04	9.50E-04
AU-199	3.139 D	5.12E-05	3.64E-07	5.16E-05
HG-197	64.14 H	6.10E-05	0.0	6.10E-05
HG-197M	23.8 H	7.03E-05	0.0	7.03E-05
HG-203	46.60 D	1.17E-04	0.0	1.17E-04
TL-200	26.1 H	6.01E-04	3.10E-05	6.32E-04
TL-201	73.06 H	7.06E-05	0.0	7.06E-05
TL-202	12.23 D	2.45E-04	7.58E-06	2.52E-04
TL-204	3.779 Y	9.73E-07	4.47E-04	4.48E-04
TL-207	4.77 M	9.58E-07	1.81E-03	1.81E-03
TL-208	3.053 M	1.22E-03	2.16E-03	3.38E-03
TL-209	2.20 M	8.78E-04	2.61E-03	3.48E-03
TL-210	1.30 M	1.15E-03	2.55E-03	3.70E-03
PB-203	52.02 H	1.72E-04	0.0	1.72E-04
PB-204M	66.9 M	9.39E-04	3.87E-04	1.33E-03
PB-205	1.51E7 Y	1.25E-05	0.0	1.25E-05
PB-209	3.253 H	0.0	1.28E-04	1.28E-04
PB-210	22.26 Y	1.55E-05	0.0	1.55E-05
PB-211	36.1 M	2.38E-05	1.59E-03	1.62E-03
PB-212	10.643 H	8.24E-05	5.25E-06	8.77E-05
PB-214	26.8 M	1.30E-04	2.46E-04	3.76E-04
BI-206	6.243 D	1.46E-03	1.72E-04	1.64E-03
BI-207	33.4 Y	6.98E-04	4.62E-04	1.16E-03
BI-208	3.68E5 Y	8.97E-04	1.01E-05	9.07E-04
BI-210	5.013 D	0.0	1.22E-03	1.22E-03
BI-211	2.13 M	2.39E-05	1.58E-07	2.41E-05
BI-212	60.55 M	8.34E-05	1.73E-03	1.81E-03
BI-213	45.65 M	6.81E-05	1.42E-03	1.49E-03

DOSE-RATE CONVERSION FACTORS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE

DOSE RATE AT BODY SURFACE FOR GROUND-SURFACE CONCENTRATION OF 1 BQ PER SQUARE CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
BI-214	19.9 M	6.13E-04	2.28E-03	2.89E-03
PO-209	102 Y	1.67E-06	0.0	1.67E-06
PO-210	138.376 D	3.83E-09	0.0	3.83E-09
PO-211	0.516 S	3.52E-06	0.0	3.52E-06
PO-212	2.98E-7 S	0.0	0.0	0.0
PO-213	4.2E-6 S	1.38E-08	0.0	1.38E-08
PO-214	1.637E-4 S	3.76E-08	0.0	3.76E-08
PO-215	1.778E-3 S	7.22E-08	0.0	7.22E-08
PO-216	0.146 S	6.53E-09	0.0	6.53E-09
PO-218	3.05 M	0.0	0.0	0.0
AT-211	7.214 H	3.12E-05	0.0	3.12E-05
AT-217	0.0323 S	1.11E-07	0.0	1.11E-07
RN-218	0.035 S	3.53E-07	0.0	3.53E-07
RN-219	3.96 S	2.88E-05	1.43E-07	2.89E-05
RN-220	55.61 S	2.47E-07	0.0	2.47E-07
RN-222	3.8235 D	1.85E-07	0.0	1.85E-07
FR-221	4.8 M	1.67E-05	0.0	1.67E-05
FR-223	21.8 M	5.05E-05	9.43E-04	9.94E-04
RA-222	38.0 S	4.60E-06	0.0	4.60E-06
RA-223	11.434 D	8.23E-05	0.0	8.23E-05
RA-224	3.62 D	5.20E-06	0.0	5.20E-06
RA-225	14.8 D	2.13E-05	6.76E-10	2.13E-05
RA-226	1600 Y	3.82E-06	0.0	3.82E-06
RA-228	5.75 Y	1.75E-11	0.0	1.75E-11
AC-225	10.0 D	2.04E-05	0.0	2.04E-05
AC-227	21.773 Y	8.49E-07	0.0	8.49E-07
AC-228	6.13 H	4.29E-04	1.13E-03	1.56E-03
TH-226	30.9 M	8.75E-06	0.0	8.75E-06
TH-227	18.718 D	8.03E-05	0.0	8.03E-05
TH-228	1.9132 Y	7.24E-06	0.0	7.24E-06
TH-229	7.34E3 Y	9.73E-05	0.0	9.73E-05
TH-230	7.7E4 Y	5.73E-06	0.0	5.73E-06
TH-231	25.52 H	5.68E-05	0.0	5.68E-05
TH-232	1.405E10 Y	5.60E-06	0.0	5.60E-06
TH-233	22.3 M	2.32E-05	1.29E-03	1.31E-03
TH-234	24.10 D	1.06E-05	0.0	1.06E-05
PA-230	17.4 D	3.38E-04	9.26E-06	3.47E-04
PA-231	3.276E4 Y	4.55E-05	0.0	4.55E-05
PA-233	27.0 D	1.38E-04	0.0	1.38E-04
PA-234	6.70 H	9.44E-04	4.40E-04	1.38E-03
PA-234M	1.17 M	5.32E-06	3.17E-03	3.17E-03
U-230	20.8 D	8.76E-06	0.0	8.76E-06
U-231	4.2 D	1.03E-04	0.0	1.03E-04
U-232	72 Y	8.20E-06	0.0	8.20E-06
U-233	1.592E5 Y	2.74E-06	0.0	2.74E-06
U-234	2.445E5 Y	7.13E-06	0.0	7.13E-06
U-235	7.038E8 Y	9.45E-05	0.0	9.45E-05
U-236	2.3415E7 Y	6.75E-06	0.0	6.75E-06
U-237	6.75 D	1.18E-04	0.0	1.18E-04

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DOSE-RATE CONVERSION FACTORS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE

DOSE RATE AT BODY SURFACE FOR GROUND-SURFACE CONCENTRATION OF 1 BQ PER SQUARE CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
U-238	4.468E9 Y	5.97E-06	0.0	5.97E-06
U-239	23.40 M	3.40E-05	1.27E-03	1.31E-03
U-240	14.1 H	2.95E-05	1.25E-06	3.07E-05
NP-235	396.1 D	2.63E-05	0.0	2.63E-05
NP-236	1.15E6 Y	1.57E-04	1.18E-08	1.57E-04
NP-236M	22.5 H	4.43E-05	1.49E-05	5.93E-05
NP-237	2.14E6 Y	5.54E-05	0.0	5.54E-05
NP-238	2.117 D	2.61E-04	6.31E-04	8.92E-04
NP-239	2.355 D	1.23E-04	9.48E-06	1.32E-04
NP-240	65 M	5.93E-04	3.94E-04	9.88E-04
NP-240M	7.4 M	1.72E-04	2.23E-03	2.40E-03
PU-236	2.851 Y	8.83E-06	0.0	8.83E-06
PU-237	45.3 D	5.90E-05	0.0	5.90E-05
PU-238	87.75 Y	7.83E-06	0.0	7.83E-06
PU-239	24131 Y	3.01E-06	0.0	3.01E-06
PU-240	6537 Y	7.45E-06	0.0	7.45E-06
PU-241	14.4 Y	0.0	0.0	0.0
PU-242	3.758E5 Y	6.18E-06	0.0	6.18E-06
PU-243	4.956 H	1.99E-05	3.94E-05	5.93E-05
PU-244	8.26E7 Y	5.36E-06	0.0	5.36E-06
PU-245	10.57 H	2.06E-04	5.21E-04	7.27E-04
PU-246	10.85 D	5.32E-05	0.0	5.32E-05
AM-241	432.2 Y	4.22E-05	0.0	4.22E-05
AM-242	16.02 H	2.75E-05	9.71E-05	1.25E-04
AM-242M	152 Y	2.00E-05	0.0	2.00E-05
AM-243	7.38E3 Y	5.47E-05	0.0	5.47E-05
AM-244	10.1 H	4.35E-04	1.95E-04	6.30E-04
AM-245	122.4 M	2.22E-05	4.64E-04	4.86E-04
AM-246	25.0 M	4.45E-04	1.42E-03	1.86E-03
CM-242	163.2 D	7.68E-06	0.0	7.68E-06
CM-243	28.5 Y	1.02E-04	0.0	1.02E-04
CM-244	18.11 Y	6.86E-06	0.0	6.86E-06
CM-245	8.5E3 Y	7.63E-05	0.0	7.63E-05
CM-246	4.75E3 Y	6.11E-06	0.0	6.11E-06
CM-247	1.56E7 Y	1.58E-04	2.50E-07	1.59E-04
CM-248	3.39E5 Y	4.84E-06	0.0	4.84E-06
CM-249	64.15 M	9.06E-06	5.36E-04	5.45E-04
CM-250	6.9E3 Y	0.0	0.0	0.0
BK-249	320 D	0.0	0.0	0.0
BK-250	3.222 H	3.98E-04	5.47E-04	9.46E-04
BK-251	57.0 M	0.0	1.06E-03	1.06E-03
CF-248	333.5 D	5.06E-06	0.0	5.06E-06
CF-249	350.6 Y	1.80E-04	7.27E-08	1.80E-04
CF-250	13.08 Y	5.00E-06	0.0	5.00E-06
CF-251	9.0E2 Y	9.45E-05	0.0	9.45E-05
CF-252	2.639 Y	4.66E-06	0.0	4.66E-06
CF-253	17.81 D	8.56E-08	0.0	8.56E-08
CF-254	60.5 D	1.61E-11	0.0	1.61E-11
ES-253	20.467 D	3.00E-06	0.0	3.00E-06

DOSE-RATE CONVERSION FACTORS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE

DOSE RATE AT BODY SURFACE FOR GROUND-SURFACE CONCENTRATION OF 1 BQ PER SQUARE CM

NUCLIDE	HALF-LIFE	PHOTON DOSE RATE (SV/YR)	ELECTRON DOSE RATE (SV/YR)	TOTAL DOSE RATE (SV/YR)
ES-254	275.7 D	6.32E-05	0.0	6.32E-05
ES-254M	39.3 H	2.80E-04	2.20E-04	5.00E-04
ES-255	39.8 D	3.55E-07	0.0	3.55E-07
FM-254	3.240 H	4.71E-06	0.0	4.71E-06
FM-255	20.07 H	3.73E-05	0.0	3.73E-05
FM-256	157.6 M	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
H-3	12.28 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BE-7	53.44 D	1.20E-05	1.14E-05	1.26E-05	1.52E-05	1.11E-05	9.97E-06	1.18E-05	1.09E-05
BE-10	1.6E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C-11	20.48 M	2.45E-04	2.32E-04	2.59E-04	3.08E-04	2.27E-04	2.04E-04	2.41E-04	2.22E-04
C-14	5.73E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N-13	9.97 M	2.45E-04	2.32E-04	2.59E-04	3.08E-04	2.27E-04	2.04E-04	2.41E-04	2.23E-04
N-16	7.13 S	7.33E-04	7.43E-04	7.86E-04	9.45E-04	7.31E-04	7.00E-04	7.82E-04	7.33E-04
O-15	122.24 S	2.45E-04	2.33E-04	2.59E-04	3.09E-04	2.27E-04	2.04E-04	2.41E-04	2.23E-04
F-18	109.74 M	2.37E-04	2.25E-04	2.51E-04	2.99E-04	2.20E-04	1.98E-04	2.34E-04	2.16E-04
NA-22	2.602 Y	4.83E-04	4.70E-04	5.28E-04	6.03E-04	4.63E-04	4.22E-04	4.92E-04	4.54E-04
NA-24	15.00 H	7.94E-04	8.13E-04	9.05E-04	1.02E-03	8.12E-04	7.59E-04	8.63E-04	8.00E-04
MG-27	9.458 M	2.06E-04	2.00E-04	2.25E-04	2.52E-04	1.97E-04	1.79E-04	2.10E-04	1.93E-04
MG-28	20.91 H	2.91E-04	2.88E-04	3.21E-04	3.72E-04	2.83E-04	2.59E-04	3.02E-04	2.78E-04
AL-26	7.2E5 Y	5.67E-04	5.66E-04	6.34E-04	7.20E-04	5.61E-04	5.16E-04	5.96E-04	5.50E-04
AL-28	2.240 M	3.54E-04	3.62E-04	4.07E-04	4.51E-04	3.61E-04	3.36E-04	3.84E-04	3.54E-04
SI-31	157.3 M	1.83E-07	1.82E-07	2.05E-07	2.27E-07	1.80E-07	1.66E-07	1.92E-07	1.77E-07
SI-32	3.3E2 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-32	14.29 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-33	25.4 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S-35	87.44 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CL-36	3.01E5 Y	9.07E-13	1.63E-19	7.23E-14	7.10E-11	1.18E-13	1.52E-15	2.24E-15	3.72E-13
CL-38	37.21 M	2.95E-04	3.04E-04	3.40E-04	3.79E-04	3.03E-04	2.83E-04	3.23E-04	2.98E-04
AR-37	35.02 D	1.53E-10	2.76E-17	1.22E-11	1.20E-08	1.99E-11	2.57E-13	3.78E-13	6.28E-11
AR-39	269 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AR-41	1.827 H	2.63E-04	2.62E-04	2.96E-04	3.27E-04	2.60E-04	2.39E-04	2.76E-04	2.55E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
H-3	12.28 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BE-7	53.44 D	1.18E-05	1.13E-05	1.21E-05	1.41E-05	1.24E-05	1.08E-05	9.72E-06	1.43E-05
BE-10	1.6E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C-11	20.48 M	2.41E-04	2.31E-04	2.48E-04	2.85E-04	2.54E-04	2.22E-04	1.99E-04	2.90E-04
C-14	5.73E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N-13	9.97 M	2.41E-04	2.31E-04	2.48E-04	2.85E-04	2.54E-04	2.22E-04	1.99E-04	2.90E-04
N-16	7.13 S	8.29E-04	7.39E-04	7.59E-04	7.97E-04	8.24E-04	6.66E-04	6.82E-04	8.07E-04
C-15	122.24 S	2.41E-04	2.31E-04	2.48E-04	2.86E-04	2.54E-04	2.22E-04	1.99E-04	2.90E-04
F-18	109.74 M	2.33E-04	2.24E-04	2.40E-04	2.77E-04	2.46E-04	2.15E-04	1.93E-04	2.81E-04
NA-22	2.602 Y	4.92E-04	4.68E-04	4.99E-04	5.47E-04	5.07E-04	4.48E-04	4.05E-04	5.56E-04
NA-24	15.00 H	8.75E-04	8.17E-04	8.55E-04	8.81E-04	8.73E-04	7.39E-04	7.15E-04	8.95E-04
MG-27	9.458 M	2.09E-04	1.99E-04	2.12E-04	2.28E-04	2.15E-04	1.93E-04	1.72E-04	2.32E-04
MG-28	20.91 H	3.03E-04	2.86E-04	3.04E-04	3.28E-04	3.06E-04	2.[illegible]E-04	2.47E-04	3.33E-04
AL-26	7.2E5 Y	5.97E-04	5.67E-04	6.00E-04	6.43E-04	6.09E-04	5.28E-04	4.91E-04	6.54E-04
AL-28	2.240 M	3.85E-04	3.64E-04	3.83E-04	3.95E-04	3.86E-04	3.34E-04	3.16E-04	4.01E-04
SI-31	157.3 M	1.91E-07	1.82E-07	1.92E-07	2.02E-07	1.94E-07	1.73E-07	1.57E-07	2.06E-07
SI-32	3.3E2 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-32	14.29 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-33	25.4 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S-35	87.44 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CL-36	3.01E5 Y	1.09E-15	8.81E-15	7.17E-13	4.30E-13	2.35E-13	3.55E-13	5.30E-13	1.16E-12
CL-38	37.21 M	3.25E-04	3.05E-04	3.21E-04	3.29E-04	3.25E-04	2.78E-04	2.66E-04	3.35E-04
AR-37	35.02 D	1.83E-13	1.49E-12	1.21E-10	7.26E-11	3.97E-11	5.99E-11	8.94E-11	1.96E-10
AR-39	269 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AR-41	1.827 H	2.76E-04	2.62E-04	2.77E-04	2.91E-04	2.79E-04	2.49E-04	2.27E-04	2.96E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
H-3	12.28 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BE-7	53.44 D	1.86E-05	1.10E-05	1.11E-05	1.63E-05	1.23E-05	1.51E-05	9.88E-06	1.30E-05
BE-10	1.6E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C-11	20.48 M	3.80E-04	2.25E-04	2.28E-04	3.33E-04	2.52E-04	3.08E-04	2.02E-04	2.65E-04
C-14	5.73E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N-13	9.97 M	3.80E-04	2.25E-04	2.28E-04	3.33E-04	2.52E-04	3.08E-04	2.02E-04	2.65E-04
N-16	7.13 S	1.07E-03	7.23E-04	7.54E-04	1.02E-03	8.25E-04	9.20E-04	6.55E-04	8.05E-04
O-15	122.24 S	3.81E-04	2.26E-04	2.28E-04	3.33E-04	2.52E-04	3.08E-04	2.02E-04	2.66E-04
F-18	109.74 M	3.69E-04	2.19E-04	2.21E-04	3.22E-04	2.44E-04	2.99E-04	1.96E-04	2.57E-04
NA-22	2.602 Y	7.59E-04	4.55E-04	4.60E-04	6.62E-04	5.17E-04	6.21E-04	4.12E-04	5.32E-04
NA-24	15.00 H	1.25E-03	7.85E-04	8.04E-04	1.11E-03	8.81E-04	1.02E-03	7.32E-04	9.04E-04
MG-27	9.458 M	3.24E-04	1.93E-04	1.96E-04	2.80E-04	2.23E-04	2.67E-04	1.73E-04	2.26E-04
MG-28	20.91 H	4.70E-04	2.77E-04	2.80E-04	4.05E-04	3.19E-04	3.82E-04	2.52E-04	3.26E-04
AL-26	7.2E5 Y	8.97E-04	5.47E-04	5.54E-04	7.87E-04	6.14E-04	7.30E-04	5.06E-04	6.36E-04
AL-28	2.240 M	5.64E-04	3.49E-04	3.54E-04	4.96E-04	3.93E-04	4.61E-04	3.28E-04	4.04E-04
SI-31	157.3 M	2.90E-07	1.75E-07	1.78E-07	2.53E-07	2.02E-07	2.40E-07	1.61E-07	2.04E-07
SI-32	3.3E2 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-32	14.29 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P-33	25.4 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S-35	87.44 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CL-36	3.01E5 Y	1.51E-10	2.04E-13	1.85E-13	6.58E-12	1.51E-16	4.53E-13	6.61E-17	9.07E-12
CL-38	37.21 M	4.70E-04	2.93E-04	2.98E-04	4.15E-04	3.28E-04	3.83E-04	2.76E-04	3.38E-04
AR-37	35.02 D	2.56E-08	3.45E-11	3.12E-11	1.11E-09	2.56E-14	7.65E-11	1.12E-14	1.53E-09
AR-39	269 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AR-41	1.827 M	4.18E-04	2.53E-04	2.56E-04	3.64E-04	2.91E-04	3.45E-04	2.32E-04	2.94E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
K-40	1.277E9 Y	3.10E-05	3.12E-05	3.51E-05	3.88E-05	3.09E-05	2.87E-05	3.29E-05	3.03E-05
K-42	12.36 H	5.46E-05	5.52E-05	6.21E-05	6.87E-05	5.47E-05	5.08E-05	5.83E-05	5.37E-05
K-43	22.6 H	2.35E-04	2.22E-04	2.47E-04	2.97E-04	2.17E-04	1.96E-04	2.31E-04	2.13E-04
CA-41	1.03E5 Y	4.01E-10	7.23E-17	3.20E-11	3.14E-08	5.22E-11	6.73E-13	9.91E-13	1.65E-10
CA-45	162.7 D	6.22E-15	5.73E-19	6.66E-16	2.97E-13	1.01E-15	5.36E-17	8.14E-18	3.09E-15
CA-47	4.536 D	2.21E-04	2.19E-04	2.47E-04	2.74E-04	2.17E-04	2.00E-04	2.31E-04	2.13E-04
CA-49	8.719 M	5.74E-04	5.92E-04	6.51E-04	7.51E-04	5.93E-04	5.61E-04	6.30E-04	5.87E-04
SC-44	3.927 H	4.81E-04	4.66E-04	5.23E-04	5.99E-04	4.59E-04	4.17E-04	4.88E-04	4.50E-04
SC-46	83.80 D	4.48E-04	4.38E-04	4.94E-04	5.49E-04	4.33E-04	3.95E-04	4.61E-04	4.24E-04
SC-46M	18.72 S	2.27E-05	2.09E-05	2.24E-05	3.59E-05	2.06E-05	1.80E-05	2.20E-05	2.02E-05
SC-47	3.422 D	2.77E-05	2.53E-05	2.72E-05	4.23E-05	2.50E-05	2.19E-05	2.66E-05	2.46E-05
SC-48	43.67 H	7.26E-04	7.15E-04	8.05E-04	8.93E-04	7.07E-04	6.47E-04	7.53E-04	6.93E-04
SC-49	57.4 M	2.07E-07	2.12E-07	2.38E-07	2.63E-07	2.11E-07	1.96E-07	2.24E-07	2.07E-07
TI-44	47.3 Y	3.02E-05	3.22E-05	3.19E-05	6.45E-05	2.86E-05	2.55E-05	3.06E-05	2.73E-05
TI-45	3.08 H	2.09E-04	1.98E-04	2.21E-04	2.63E-04	1.94E-04	1.74E-04	2.06E-04	1.90E-04
TI-51	5.752 M	9.09E-05	8.47E-05	9.30E-05	1.19E-04	8.28E-05	7.45E-05	8.77E-05	8.18E-05
V-48	15.971 D	6.37E-04	6.25E-04	7.02E-04	7.89E-04	6.17E-04	5.64E-04	6.56E-04	6.04E-04
V-49	330 D	1.47E-09	2.64E-16	1.17E-10	1.15E-07	1.91E-10	2.46E-12	3.62E-12	6.01E-10
V-52	3.75 M	2.88E-04	2.90E-04	3.27E-04	3.61E-04	2.87E-04	2.66E-04	3.06E-04	2.82E-04
CR-49	42.09 M	2.51E-04	2.39E-04	2.64E-04	3.29E-04	2.33E-04	2.09E-04	2.47E-04	2.28E-04
CR-51	27.704 D	7.88E-06	7.27E-06	7.94E-06	1.06E-05	7.10E-06	6.37E-06	7.51E-06	7.03E-06
MN-52	5.591 D	7.56E-04	7.41E-04	8.34E-04	9.35E-04	7.32E-04	6.69E-04	7.79E-04	7.17E-04
MN-52M	21.4 M	5.21E-04	5.10E-04	5.72E-04	6.54E-04	5.02E-04	4.59E-04	5.34E-04	4.93E-04
MN-53	3.7E6 Y	3.08E-09	5.55E-16	2.45E-10	2.41E-07	4.01E-10	5.17E-12	7.61E-12	1.26E-09
MN-54	312.7 D	1.96E-04	1.89E-04	2.13E-04	2.39E-04	1.87E-04	1.69E-04	1.99E-04	1.82E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
K-40	1.277E9 Y	3.29E-05	3.12E-05	3.29E-05	3.44E-05	3.32E-05	2.93E-05	2.71E-05	3.49E-05
K-42	12.36 H	5.83E-05	5.52E-05	5.82E-05	6.07E-05	5.87E-05	5.17E-05	4.79E-05	6.17E-05
K-43	22.6 H	2.30E-04	2.21E-04	2.37E-04	2.75E-04	2.43E-04	2.11E-04	1.90E-04	2.79E-04
CA-41	1.03E5 Y	4.80E-13	3.90E-12	3.17E-10	1.90E-10	1.04E-10	1.57E-10	2.34E-10	5.14E-10
CA-45	162.7 D	7.73E-17	2.13E-16	5.62E-15	4.85E-15	1.88E-15	2.89E-15	3.76E-15	9.16E-15
CA-47	4.536 D	2.30E-04	2.19E-04	2.32E-04	2.45E-04	2.34E-04	2.08E-04	1.89E-04	2.49E-04
CA-49	8.719 M	6.48E-04	5.96E-04	6.19E-04	6.34E-04	6.41E-04	5.24E-04	5.28E-04	6.43E-04
SC-44	3.927 H	4.87E-04	4.64E-04	4.95E-04	5.46E-04	5.03E-04	4.45E-04	4.01E-04	5.54E-04
SC-46	83.80 D	4.60E-04	4.36E-04	4.64E-04	4.95E-04	4.69E-04	4.21E-04	3.77E-04	5.04E-04
SC-46M	18.72 S	2.12E-05	2.09E-05	2.30E-05	3.50E-05	2.11E-05	1.81E-05	1.73E-05	3.59E-05
SC-47	3.422 D	2.58E-05	2.53E-05	2.78E-05	4.10E-05	2.63E-05	2.20E-05	2.13E-05	4.20E-05
SC-48	43.67 H	7.51E-04	7.12E-04	7.56E-04	8.03E-04	7.64E-04	6.83E-04	6.16E-04	8.16E-04
SC-49	57.4 M	2.25E-07	2.12E-07	2.24E-07	2.31E-07	2.26E-07	1.96E-07	1.85E-07	2.35E-07
TI-44	47.3 Y	3.33E-05	3.19E-05	3.52E-05	6.17E-05	2.24E-05	2.62E-05	2.16E-05	6.33E-05
TI-45	3.08 H	2.06E-04	1.97E-04	2.12E-04	2.43E-04	2.16E-04	1.89E-04	1.70E-04	2.47E-04
TI-51	5.752 M	8.76E-05	8.43E-05	9.08E-05	1.11E-04	9.35E-05	7.83E-05	7.28E-05	1.13E-04
V-48	15.971 D	6.55E-04	6.22E-04	6.62E-04	7.12E-04	6.70E-04	5.96E-04	5.38E-04	7.24E-04
V-49	330 D	1.76E-12	1.42E-11	1.16E-09	6.95E-10	3.80E-10	5.74E-10	8.56E-10	1.88E-09
V-52	3.75 M	3.05E-04	2.90E-04	3.06E-04	3.20E-04	3.08E-04	2.73E-04	2.51E-04	3.25E-04
CR-49	42.09 M	2.47E-04	2.37E-04	2.56E-04	3.07E-04	2.56E-04	2.25E-04	2.02E-04	3.12E-04
CR-51	27.704 D	7.51E-06	7.24E-06	7.82E-06	9.80E-06	8.08E-06	6.66E-06	6.26E-06	9.98E-06
MN-52	5.591 D	7.77E-04	7.38E-04	7.85E-04	8.43E-04	7.95E-04	7.07E-04	6.38E-04	8.57E-04
MN-52M	21.4 M	5.34E-04	5.09E-04	5.41E-04	5.91E-04	5.49E-04	4.83E-04	4.40E-04	6.01E-04
MN-53	3.7E6 Y	3.69E-12	2.99E-11	2.43E-09	1.46E-09	7.99E-10	1.21E-09	1.80E-09	3.95E-09
MN-54	312.7 D	1.98E-04	1.88E-04	2.01E-04	2.17E-04	2.04E-04	1.83E-04	1.62E-04	2.21E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
K-40	1.277E9 Y	4.93E-05	3.01E-05	3.04E-05	4.31E-05	3.44E-05	4.06E-05	2.79E-05	3.49E-05
K-42	12.36 H	8.70E-05	5.32E-05	5.37E-05	7.61E-05	6.06E-05	7.15E-05	4.94E-05	6.17E-05
K-43	22.6 H	3.63E-04	2.16E-04	2.18E-04	3.18E-04	2.43E-04	2.97E-04	1.93E-04	2.53E-04
CA-41	1.03E5 Y	6.70E-08	9.04E-11	8.17E-11	2.91E-09	6.70E-14	2.00E-10	2.92E-14	4.01E-09
CA-45	162.7 D	5.57E-13	1.96E-15	1.92E-15	4.34E-14	1.96E-17	5.45E-15	7.31E-19	4.89E-14
CA-47	4.536 D	3.50E-04	2.11E-04	2.14E-04	3.04E-04	2.43E-04	2.88E-04	1.93E-04	2.46E-04
CA-49	8.719 M	8.85E-04	5.73E-04	5.94E-04	8.10E-04	6.37E-04	7.27E-04	5.33E-04	6.54E-04
SC-44	3.927 H	7.55E-04	4.51E-04	4.57E-04	6.58E-04	5.13E-04	6.18E-04	4.07E-04	5.28E-04
SC-46	83.80 D	7.07E-04	4.22E-04	4.30E-04	6.12E-04	4.90E-04	5.84E-04	3.82E-04	4.94E-04
SC-46M	18.72 S	3.44E-05	2.09E-05	2.07E-05	3.20E-05	2.47E-05	3.16E-05	1.84E-05	2.50E-05
SC-47	3.422 D	4.14E-05	2.53E-05	2.51E-05	3.84E-05	2.95E-05	3.76E-05	2.23E-05	3.01E-05
SC-48	43.67 H	1.15E-03	6.89E-04	7.00E-04	9.96E-04	7.98E-04	9.49E-04	6.26E-04	8.03E-04
SC-49	57.4 M	3.30E-07	2.04E-07	2.07E-07	2.90E-07	2.30E-07	2.70E-07	1.92E-07	2.36E-07
TI-44	47.3 Y	5.84E-05	2.93E-05	2.99E-05	5.37E-05	4.19E-05	5.33E-05	2.56E-05	4.02E-05
TI-45	3.08 H	3.25E-04	1.92E-04	1.94E-04	2.84E-04	2.15E-04	2.63E-04	1.72E-04	2.26E-04
TI-51	5.752 M	1.38E-04	8.30E-05	8.32E-05	1.22E-04	9.32E-05	1.15E-04	7.42E-05	9.73E-05
V-48	15.971 D	1.01E-03	6.03E-04	6.12E-04	8.74E-04	6.92E-04	8.27E-04	5.47E-04	7.04E-04
V-49	330 D	2.45E-07	3.30E-10	2.99E-10	1.06E-08	2.45E-13	7.33E-10	1.07E-13	1.47E-08
V-52	3.75 M	4.59E-04	2.79E-04	2.82E-04	4.00E-04	3.20E-04	3.78E-04	2.58E-04	3.24E-04
CR-49	42.09 M	3.93E-04	2.32E-04	2.34E-04	3.46E-04	2.62E-04	3.22E-04	2.07E-04	2.74E-04
CR-51	27.704 D	1.22E-05	7.16E-06	7.15E-06	1.06E-05	7.98E-06	9.93E-06	6.39E-06	8.41E-06
MN-52	5.591 D	1.19E-03	7.15E-04	7.25E-04	1.04E-03	8.21E-04	9.80E-04	6.50E-04	8.35E-04
MN-52M	21.4 M	8.20E-04	4.93E-04	4.98E-04	7.16E-04	5.58E-04	6.70E-04	4.50E-04	5.76E-04
MN-53	3.7E6 Y	5.14E-07	6.94E-10	6.27E-10	2.23E-08	5.14E-13	1.54E-09	2.24E-13	3.08E-08
MN-54	312.7 D	3.08E-04	1.82E-04	1.86E-04	2.66E-04	2.11E-04	2.53E-04	1.63E-04	2.14E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	GRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
MN-56	2.5785 H	3.66E-04	3.64E-04	4.08E-04	4.57E-04	3.61E-04	3.32E-04	3.84E-04	3.54E-04
MN-57	1.47 M	1.67E-05	1.60E-05	1.77E-05	2.38E-05	1.57E-05	1.41E-05	1.68E-05	1.54E-05
FE-52	8.275 H	1.79E-04	1.68E-04	1.86E-04	2.36E-04	1.65E-04	1.47E-04	1.75E-04	1.62E-04
FE-55	2.7 Y	4.30E-09	7.75E-16	3.43E-10	3.37E-07	5.60E-10	7.23E-12	1.06E-11	1.77E-09
FE-59	44.63 D	2.52E-04	2.49E-04	2.81E-04	3.11E-04	2.46E-04	2.26E-04	2.62E-04	2.42E-04
CO-56	78.76 D	7.55E-04	7.53E-04	8.43E-04	9.48E-04	7.47E-04	6.89E-04	7.95E-04	7.34E-04
CO-57	270.9 D	3.01E-05	2.80E-05	2.99E-05	5.14E-05	2.76E-05	2.38E-05	2.96E-05	2.68E-05
CO-58	70.80 D	2.30E-04	2.21E-04	2.48E-04	2.82E-04	2.18E-04	1.97E-04	2.32E-04	2.13E-04
CO-58M	9.15 H	7.28E-09	4.41E-10	7.18E-10	5.41E-07	1.08E-09	1.98E-10	5.67E-10	3.14E-09
CO-60	5.271 Y	5.20E-04	5.17E-04	5.82E-04	6.43E-04	5.11E-04	4.71E-04	5.44E-04	5.01E-04
CO-60M	10.47 M	9.06E-07	9.33E-07	9.95E-07	1.98E-06	8.75E-07	8.08E-07	9.39E-07	8.58E-07
CO-61	1.650 H	1.96E-05	2.05E-05	2.10E-05	3.64E-05	1.86E-05	1.69E-05	1.99E-05	1.79E-05
NI-56	6.10 D	4.02E-04	3.86E-04	4.31E-04	5.12E-04	3.80E-04	3.44E-04	4.04E-04	3.73E-04
NI-57	36.08 H	4.02E-04	3.99E-04	4.48E-04	5.07E-04	3.95E-04	3.63E-04	4.20E-04	3.87E-04
NI-59	7.5E4 Y	8.10E-09	1.46E-15	6.45E-10	6.34E-07	1.05E-09	1.36E-11	2.00E-11	3.32E-09
NI-63	100.1 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NI-65	2.520 H	1.13E-04	1.12E-04	1.27E-04	1.41E-04	1.11E-04	1.03E-04	1.19E-04	1.09E-04
CU-61	3.408 H	1.96E-04	1.87E-04	2.08E-04	2.48E-04	1.82E-04	1.64E-04	1.94E-04	1.79E-04
CU-62	9.74 M	2.41E-04	2.29E-04	2.55E-04	3.04E-04	2.24E-04	2.02E-04	2.38E-04	2.20E-04
CU-64	12.701 H	4.52E-05	4.29E-05	4.79E-05	5.73E-05	4.20E-05	3.78E-05	4.45E-05	4.11E-05
CU-67	61.88 D	2.88E-05	2.66E-05	2.83E-05	4.45E-05	2.59E-05	2.29E-05	2.76E-05	2.55E-05
ZN-62	9.26 H	1.07E-04	1.03E-04	1.13E-04	1.40E-04	9.96E-05	8.99E-05	1.06E-04	9.78E-05
ZN-65	244.4 D	1.26E-04	1.24E-04	1.40E-04	1.56E-04	1.22E-04	1.12E-04	1.30E-04	1.20E-04
ZN-69	55.6 M	1.47E-09	1.38E-09	1.52E-09	1.89E-09	1.35E-09	1.21E-09	1.43E-09	1.32E-09
ZN-69M	13.76 H	1.01E-04	9.54E-05	1.06E-04	1.30E-04	9.31E-05	8.37E-05	9.87E-03	9.15E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
MN-56	2.5785 H	3.85E-04	3.64E-04	3.85E-04	4.07E-04	3.91E-04	3.43E-04	3.15E-04	4.14E-04
MN-57	1.47 M	1.66E-05	1.59E-05	1.72E-05	2.08E-05	1.69E-05	1.49E-05	1.36E-05	2.12E-05
FE-52	8.275 H	1.74E-04	1.67E-04	1.81E-04	2.20E-04	1.82E-04	1.57E-04	1.44E-04	2.24E-04
FE-55	2.7 Y	5.16E-12	4.18E-11	3.40E-09	2.04E-09	1.12E-09	1.68E-09	2.51E-09	5.52E-09
FE-59	44.63 D	2.62E-04	2.48E-04	2.63E-04	2.79E-04	2.66E-04	2.37E-04	2.15E-04	2.83E-04
CO-56	78.76 D	7.99E-04	7.53E-04	7.95E-04	8.40E-04	8.09E-04	7.05E-04	6.54E-04	8.54E-04
CO-57	270.9 D	2.84E-05	2.80E-05	3.10E-05	4.86E-05	2.70E-05	2.42E-05	2.28E-05	5.00E-05
CO-58	70.80 D	2.31E-04	2.20E-04	2.35E-04	2.58E-04	2.39E-04	2.13E-04	1.89E-04	2.62E-04
CO-58M	9.15 H	8.59E-10	3.61E-10	5.95E-09	4.08E-09	1.96E-09	3.05E-09	4.26E-09	9.69E-09
CO-60	5.271 Y	5.43E-04	5.15E-04	5.46E-04	5.74E-04	5.51E-04	4.91E-04	4.46E-04	5.84E-04
CO-60M	10.47 M	9.89E-07	9.24E-07	9.96E-07	1.26E-06	8.66E-07	8.44E-07	7.41E-07	1.29E-06
CO-61	1.650 H	2.15E-05	2.03E-05	2.21E-05	3.38E-05	1.65E-05	1.77E-05	1.48E-05	3.46E-05
NI-56	6.10 D	4.03E-04	3.84E-04	4.12E-04	4.70E-04	4.16E-04	3.66E-04	3.31E-04	4.79E-04
NI-57	36.08 H	4.20E-04	3.99E-04	4.23E-04	4.54E-04	4.28E-04	3.76E-04	3.45E-04	4.61E-04
NI-59	7.5E4 Y	9.70E-12	7.87E-11	6.40E-09	3.84E-09	2.10E-09	3.17E-09	4.73E-09	1.04E-08
NI-63	100.1 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NI-65	2.520 H	1.18E-04	1.12E-04	1.19E-04	1.25E-04	1.20E-04	1.06E-04	9.73E-05	1.27E-04
CU-61	3.408 H	1.94E-04	1.85E-04	1.99E-04	2.29E-04	2.03E-04	1.78E-04	1.60E-04	2.32E-04
CU-62	9.74 M	2.38E-04	2.28E-04	2.45E-04	2.81E-04	2.50E-04	2.19E-04	1.96E-04	2.86E-04
CU-64	12.701 H	4.45E-05	4.27E-05	4.58E-05	5.26E-05	4.68E-05	4.10E-05	3.67E-05	5.34E-05
CU-67	61.88 D	2.72E-05	2.65E-05	2.90E-05	4.25E-05	2.73E-05	2.31E-05	2.21E-05	4.36E-05
ZN-62	9.26 H	1.07E-04	1.02E-04	1.09E-04	1.27E-04	1.11E-04	9.76E-05	8.71E-05	1.29E-04
ZN-65	244.4 D	1.30E-04	1.23E-04	1.31E-04	1.39E-04	1.32E-04	1.19E-04	1.07E-04	1.42E-04
ZN-69	55.6 M	1.43E-09	1.37E-09	1.48E-09	1.76E-09	1.52E-09	1.29E-09	1.18E-09	1.79E-09
ZN-69M	13.76 H	9.87E-05	9.48E-05	1.02E-04	1.20E-04	1.05E-04	9.00E-05	8.18E-05	1.22E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
MN-56	2.5785 H	5.70E-04	3.51E-04	3.58E-04	5.05E-04	4.00E-04	4.74E-04	3.23E-04	4.08E-04
MN-57	1.47 M	2.87E-05	1.56E-05	1.57E-05	2.33E-05	1.80E-05	2.20E-05	1.39E-05	1.86E-05
FE-52	8.275 H	2.76E-04	1.64E-04	1.65E-04	2.44E-04	1.85E-04	2.29E-04	1.47E-04	1.94E-04
FE-55	2.7 Y	7.19E-07	9.70E-10	8.77E-10	3.12E-08	7.19E-13	2.15E-09	3.14E-13	4.30E-08
FE-59	44.63 D	3.99E-04	2.40E-04	2.43E-04	3.46E-04	2.78E-04	3.30E-04	2.19E-04	2.80E-04
CO-56	78.76 D	1.19E-03	7.26E-04	7.41E-04	1.04E-03	8.27E-04	9.76E-04	6.67E-04	8.44E-04
CO-57	270.9 D	4.99E-05	2.78E-05	2.77E-05	4.38E-05	3.36E-05	4.33E-05	2.44E-05	3.42E-05
CO-58	70.80 D	3.61E-04	2.13E-04	2.17E-04	3.12E-04	2.45E-04	2.95E-04	1.91E-04	2.50E-04
CO-58M	9.15 H	1.15E-06	1.85E-09	1.74E-09	5.18E-08	4.08E-10	4.52E-09	7.77E-11	7.00E-08
CO-60	5.271 Y	8.24E-04	4.98E-04	5.04E-04	7.17E-04	5.74E-04	6.81E-04	4.56E-04	5.79E-04
CO-60M	10.47 M	2.80E-06	8.70E-07	8.87E-07	1.45E-06	1.09E-06	1.33E-06	7.84F-07	1.16E-06
CO-61	1.650 H	3.67E-05	1.88E-05	1.93E-05	3.27E-05	2.56E-05	3.19E-05	1.66E-05	2.49E-05
NI-56	6.10 D	6.28E-04	3.74E-04	3.79E-04	5.49E-04	4.30E-04	5.21E-04	3.36E-04	4.40E-04
NI-57	36.08 H	6.37E-04	3.86E-04	3.90E-04	5.56E-04	4.38E-04	5.22E-04	3.55E-04	4.49E-04
NI-59	7.5E4 Y	1.35E-06	1.83E-09	1.65E-09	5.87E-08	1.35E-12	4.05E-09	5.90E-13	8.10E-08
NI-63	100.1 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NI-65	2.520 H	1.79E-04	1.08E-04	1.10E-04	1.56E-04	1.24E-04	1.47E-04	9.98E-05	1.26E-04
CU-61	3.408 H	3.06E-04	1.81E-04	1.83E-04	2.67E-04	2.03E-04	2.48E-04	1.62E-04	2.13E-04
CU-62	9.74 M	3.75E-04	2.22E-04	2.25E-04	3.28E-04	2.49E-04	3.04E-04	1.99E-04	2.62E-04
CU-64	12.701 H	7.10E-05	4.17E-05	4.21E-05	6.15E-05	4.66E-05	5.69E-05	3.73E-05	4.90E-05
CU-67	61.88 D	4.43E-05	2.63E-05	2.61E-05	4.04E-05	3.10E-05	3.94E-05	2.33E-05	3.16E-05
ZN-62	9.26 H	1.73E-04	9.90E-05	1.00E-04	1.48E-04	1.13E-04	1.38E-04	8.85E-05	1.18E-0[illegible]
ZN-65	244.4 D	2.01E-04	1.19E-04	1.21E-04	1.73E-04	1.38E-04	1.65E-04	1.08E-04	1.39E-04
ZN-69	55.6 M	2.25E-09	1.35E-09	1.35E-09	1.99E-09	1.50E-09	1.84E-09	1.20E-09	1.58E-09
ZN-69M	13.76 H	1.56E-04	9.30E-05	9.36E-05	1.37E-04	1.03E-04	1.27E-04	8.31E-05	1.09E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
GA-66	9.40 H	5.07E-04	5.06E-04	5.62E-04	6.47E-04	5.02E-04	4.65E-04	5.34E-04	4.94E-04
GA-67	3.261 D	3.58E-05	3.35E-05	3.59E-05	5.54E-05	3.25E-05	2.88E-05	3.46E-05	3.20E-05
GA-68	68.0 M	2.27E-04	2.16E-04	2.40E-04	2.86E-04	2.11E-04	1.90E-04	2.24E-04	2.07E-04
GA-72	14.1 H	5.78E-04	5.77E-04	6.46E-04	7.26E-04	5.73E-04	5.27E-04	6.10E-04	5.62E-04
GE-68	288 D	2.27E-08	5.16E-15	1.82E-09	1.76E-06	2.96E-09	3.96E-11	5.34E-11	9.34E-09
GE-71	11.8 D	2.29E-08	5.22E-15	1.84E-09	1.78E-06	3.00E-09	4.01E-11	5.40E-11	9.45E-09
GE-77	11.30 H	2.50E-04	2.38E-04	2.63E-04	3.22E-04	2.33E-04	2.11E-04	2.48E-04	2.30E-04
AS-72	26.0 H	4.18E-04	4.02E-04	4.49E-04	5.21E-04	3.95E-04	3.57E-04	4.19E-04	3.86E-04
AS-73	80.30 D	1.06E-06	1.19E-06	1.03E-06	7.58E-06	9.13E-07	8.58E-07	1.02E-06	9.21E-07
AS-74	17.77 D	1.83E-04	1.74E-04	1.95E-04	2.29E-04	1.71E-04	1.54E-04	1.81E-04	1.67E-04
AS-76	26.32 H	9.88E-05	9.54E-05	1.07E-04	1.23E-04	9.38E-05	8.50E-05	9.96E-05	9.19E-05
AS-77	38.8 H	2.13E-06	1.98E-06	2.16E-06	2.90E-06	1.93E-06	1.73E-06	2.05E-06	1.91E-06
SE-73	7.15 H	2.63E-04	2.50E-04	2.75E-04	3.48E-04	2.43E-04	2.18E-04	2.57E-04	2.38E-04
SE-75	119.78 D	9.71E-05	8.95E-05	9.67E-05	1.42E-04	8.75E-05	7.77E-05	9.28E-05	8.64E-05
SE-79	6.5E4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BR-77	57.04 H	7.65E-05	7.20E-05	7.95E-05	1.02E-04	7.04E-05	6.33E-05	7.47E-05	6.93E-05
BR-80	17.4 M	1.78E-05	1.70E-05	1.90E-05	2.24E-05	1.67E-05	1.50E-05	1.77E-05	1.63E-05
BR-80M	4.42 H	1.53E-06	2.12E-06	1.09E-06	1.21E-05	1.03E-06	1.15E-06	1.62E-06	1.27E-06
BR-82	35.30 H	6.02E-04	5.84E-04	6.55E-04	7.43E-04	5.75E-04	5.22E-04	6.12E-04	5.63E-04
BR-83	2.39 H	1.79E-06	1.70E-06	1.89E-06	2.24E-06	1.66E-06	1.49E-06	1.76E-06	1.63E-06
BR-84	31.80 M	3.59E-04	3.62E-04	4.03E-04	4.56E-04	3.60E-04	3.35E-04	3.83E-04	3.55E-04
BR-85	172 S	1.51E-05	1.47E-05	1.65E-05	1.85E-05	1.45E-05	1.32E-05	1.55E-05	1.42E-05
KR-79	35.04 H	6.09E-05	5.74E-05	6.35E-05	8.21E-05	5.61E-05	5.05E-05	5.96E-05	5.53E-05
KR-81	2.1E5 Y	2.58E-06	2.29E-06	2.49E-06	7.23E-06	2.25E-06	2.01E-06	2.37E-06	2.26E-06
KR-83M	1.83 H	3.49E-08	2.18E-09	4.71E-09	1.56E-06	6.57E-09	1.46E-09	1.78E-09	1.81E-08

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
GA-66	9.40 H	5.41E-04	5.07E-04	5.34E-04	5.69E-04	5.48E-04	4.67E-04	4.43E-04	5.78E-04
GA-67	3.261 D	3.44E-05	3.33E-05	3.64E-05	5.11E-05	3.45E-05	2.97E-05	2.78E-05	5.23E-05
GA-68	68.0 M	2.24E-04	2.14E-04	2.30E-04	2.64E-04	2.35E-04	2.06E-04	1.85E-04	2.68E-04
GA-72	14.1 H	6.12E-04	5.77E-04	6.11E-04	6.45E-04	6.20E-04	5.40E-04	5.01E-04	6.55E-04
GE-68	288 D	2.88E-11	2.27E-10	1.80E-08	1.09E-08	5.90E-09	8.90E-09	1.32E-08	2.92E-08
GE-71	11.8 D	2.91E-11	2.30E-10	1.82E-08	1.10E-08	5.97E-09	9.00E-09	1.34E-08	2.95E-08
GE-77	11.30 H	2.47E-04	2.37E-04	2.54E-04	2.97E-04	2.58E-04	2.22E-04	2.04E-04	3.02E-04
AS-72	26.0 H	4.19E-04	3.99E-04	4.27E-04	4.76E-04	4.35E-04	3.84E-04	3.44E-04	4.84E-04
AS-73	80.30 D	1.32E-06	1.14E-06	1.32E-06	2.32E-06	6.51E-07	9.46E-07	7.18E-07	2.43E-06
AS-74	17.77 D	1.81E-04	1.73E-04	1.86E-04	2.11E-04	1.90E-04	1.67E-04	1.49E-04	2.14E-04
AS-76	26.32 H	9.96E-05	9.49E-05	1.01E-04	1.12E-04	1.03E-04	9.11E-05	8.19E-05	1.14E-04
AS-77	38.8 H	2.04E-06	1.97E-06	2.13E-06	2.72E-06	2.16E-06	1.81E-06	1.69E-06	2.77E-06
SE-73	7.15 H	2.59E-04	2.48E-04	2.67E-04	3.22E-04	2.69E-04	2.35E-04	2.12E-04	3.27E-04
SE-75	119.78 D	9.19E-05	8.91E-05	9.70E-05	1.32E-04	9.59E-05	7.99E-05	7.59E-05	1.35E-04
SE-79	6.5E4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BR-77	57.04 H	7.46E-05	7.16E-05	7.71E-05	9.20E-05	7.86E-05	6.75E-05	6.16E-05	9.37E-05
BR-80	17.4 M	1.77E-05	1.69E-05	1.81E-05	2.04E-05	1.85E-05	1.63E-05	1.46E-05	2.08E-05
BR-80M	4.42 H	2.90E-06	1.65E-06	1.98E-06	3.39E-06	7.89E-07	1.42E-06	9.70E-07	3.54E-06
BR-82	35.30 H	6.10E-04	5.81E-04	6.19E-04	6.75E-04	6.29E-04	5.60E-04	5.01E-04	6.87E-04
BR-83	2.39 H	1.76E-06	1.69E-06	1.81E-06	2.07E-06	1.85E-06	1.62E-06	1.45E-06	2.11E-06
BR-84	31.80 M	3.88E-04	3.63E-04	3.81E-04	3.98E-04	3.90E-04	3.34E-04	3.17E-04	4.05E-04
BR-85	172 S	1.54E-05	1.46E-05	1.56E-05	1.68E-05	1.58E-05	1.41E-05	1.26E-05	1.70E-05
KR-79	35.04 H	5.95E-05	5.71E-05	6.14E-05	7.26E-05	6.28E-05	5.40E-05	4.92E-05	7.39E-05
KR-81	2.1E5 Y	2.37E-06	2.29E-06	2.54E-06	3.25E-06	2.57E-06	2.10E-06	2.02E-06	3.37E-06
KR-83M	1.83 H	4.07E-09	3.02E-09	3.25E-08	3.07E-08	1.10E-08	1.73E-08	2.11E-08	5.33E-08

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
GA-66	9.40 H	7.92E-04	4.89E-04	5.02E-04	7.04E-04	5.51E-04	6.47E-04	4.49E-04	5.67E-04
GA-67	3.261 D	5.93E-05	3.29E-05	3.28E-05	5.06E-05	3.85E-05	4.86E-05	2.91E-05	3.98E-05
GA-68	68.0 M	3.53E-04	2.09E-04	2.12E-04	3.09E-04	2.34E-04	2.86E-04	1.87E-04	2.46E-04
GA-72	14.1 H	9.12E-04	5.56E-04	5.68E-04	8.00E-04	6.32E-04	7.47E-04	5.12E-04	6.47E-04
GE-68	288 D	3.73E-06	5.15E-09	4.66E-09	1.64E-07	4.12E-12	1.15E-08	1.63E-12	2.25E-07
GE-71	11.8 D	3.78E-06	5.21E-09	4.72E-09	1.66E-07	4.17E-12	1.16E-08	1.65E-12	2.28E-07
GE-77	11.30 H	3.86E-04	2.31E-04	2.33E-04	3.39E-04	2.63E-04	3.20E-04	2.08E-04	2.71E-04
AS-72	26.0 H	6.54E-04	3.88E-04	3.94E-04	5.69E-04	4.40E-04	5.32E-04	3.49E-04	4.56E-04
AS-73	80.30 D	1.27E-05	9.90E-07	1.04E-06	2.67E-06	1.59E-06	2.10E-06	8.09E-07	2.21E-06
AS-74	17.77 D	2.87E-04	1.69E-04	1.71E-04	2.49E-04	1.90E-04	2.32E-04	1.51E-04	1.99E-04
AS-76	26.32 H	1.55E-04	9.23E-05	9.35E-05	1.35E-04	1.04E-04	1.26E-04	8.32E-05	1.08E-04
AS-77	38.8 H	3.24E-06	1.95E-06	1.95E-06	2.90E-06	2.20E-06	2.74E-06	1.73E-06	2.29E-06
SE-73	7.15 H	4.15E-04	2.42E-04	2.44E-04	3.62E-04	2.74E-04	3.37E-04	2.16E-04	2.88E-04
SE-75	119.78 D	1.53E-04	8.84E-05	8.81E-05	1.33E-04	1.01E-04	1.27E-04	7.85E-05	1.05E-04
SE-79	6.5E4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BR-77	57.04 H	1.24E-04	7.02E-05	7.07E-05	1.04E-04	7.91E-05	9.73E-05	6.27E-05	8.30E-05
BR-80	17.4 M	2.82E-05	1.65E-05	1.67E-05	2.42E-05	1.86E-05	2.26E-05	1.47E-05	1.94E-05
BR-80M	4.42 H	1.77E-05	1.33E-06	1.47E-06	5.34E-06	2.65E-06	3.72E-06	9.81E-07	3.94E-06
BR-82	35.30 H	9.45E-04	5.63E-04	5.72E-04	8.21E-04	6.45E-04	7.75E-04	5.08E-04	6.60E-04
BR-83	2.39 H	2.78E-06	1.65E-06	1.67E-06	2.43E-06	1.84E-06	2.25E-06	1.47E-06	1.94E-06
BR-84	31.80 M	5.62E-04	3.49E-04	3.58E-04	5.00E-04	3.95E-04	4.62E-04	3.22E-04	4.04E-04
BR-85	172 S	2.38E-05	1.42E-05	1.44E-05	2.06E-05	1.63E-05	1.95E-05	1.28E-05	1.66E-05
KR-79	35.04 H	1.01E-04	5.59E-05	5.64E-05	8.30E-05	6.29E-05	7.73E-05	5.00E-05	6.63E-05
KR-81	2.1E5 Y	1.10E-05	2.29E-06	2.28E-06	3.89E-06	2.54E-06	3.24E-06	2.02E-06	3.27E-06
KR-83M	1.83 H	2.92E-06	1.22E-08	1.23E-08	2.37E-07	2.80E-09	3.52E-08	7.99E-10	2.61E-07

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
KR-85	10.72 Y	5.35E-07	5.08E-07	5.66E-07	6.74E-07	4.97E-07	4.47E-07	5.27E-07	4.87E-07
KR-85M	4.48 H	4.00E-05	3.67E-05	3.95E-05	6.02E-05	3.61E-05	3.18E-05	3.84E-05	3.55E-05
KR-87	76.3 M	1.68E-04	1.67E-04	1.85E-04	2.15E-04	1.66E-04	1.53E-04	1.76E-04	1.63E-04
KR-88	2.84 H	3.95E-04	4.02E-04	4.49E-04	5.09E-04	4.01E-04	3.73E-04	4.27E-04	3.95E-04
KR-89	3.16 M	3.79E-04	3.78E-04	4.21E-04	4.82E-04	3.75E-04	3.46E-04	3.98E-04	3.69E-04
KR-90	32.32 S	2.73E-04	2.70E-04	3.02E-04	3.48E-04	2.67E-04	2.44E-04	2.84E-04	2.61E-04
RB-81	4.58 H	1.47E-04	1.38E-04	1.53E-04	1.97E-04	1.35E-04	1.21E-04	1.43E-04	1.33E-04
RB-82	1.25 M	2.62E-04	2.49E-04	2.78E-04	3.29E-04	2.43E-04	2.19E-04	2.58E-04	2.39E-04
RB-83	86.2 D	1.19E-04	1.13E-04	1.27E-04	1.55E-04	1.11E-04	9.99E-05	1.18E-04	1.09E-04
RB-84	32.9 D	2.10E-04	2.02E-04	2.27E-04	2.62E-04	1.99E-04	1.80E-04	2.11E-04	1.95E-04
RB-86	18.66 D	2.07E-05	2.04E-05	2.29E-05	2.54E-05	2.01E-05	1.84E-05	2.14E-05	1.97E-05
RB-87	4.73E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RB-88	17.8 M	1.30E-04	1.32E-04	1.47E-04	1.64E-04	1.31E-04	1.22E-04	1.39E-04	1.29E-04
RB-89	15.44 M	4.33E-04	4.33E-04	4.85E-04	5.42E-04	4.30E-04	3.96E-04	4.57E-04	4.22E-04
RB-90	157 S	3.96E-04	4.01E-04	4.39E-04	5.10E-04	3.99E-04	3.76E-04	4.24E-04	3.95E-04
RB-90M	258 S	6.57E-04	6.61E-04	7.35E-04	8.33E-04	6.57E-04	6.10E-04	6.98E-04	6.47E-04
SR-82	25.0 D	1.42E-07	2.32E-10	1.81E-08	5.38E-06	2.64E-08	2.73E-09	5.12E-10	7.64E-08
SR-85	64.84 D	1.23E-04	1.16E-04	1.30E-04	1.60E-04	1.14E-04	1.02E-04	1.21E-04	1.11E-04
SR-85M	67.66 M	5.46E-05	4.98E-05	5.35E-05	7.81E-05	4.86E-05	4.34E-05	5.14E-05	4.83E-05
SR-87M	2.805 H	7.88E-05	7.35E-05	8.10E-05	1.03E-04	7.18E-05	6.45E-05	7.60E-05	7.08E-05
SR-89	50.55 D	3.15E-08	3.06E-08	3.44E-08	3.85E-08	3.02E-08	2.74E-08	3.22E-08	2.96E-08
SR-90	28.6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SR-91	9.5 H	1.57E-04	1.52E-04	1.71E-04	1.93E-04	1.50E-04	1.37E-04	1.60E-04	1.47E-04
SR-92	2.71 H	2.72E-04	2.72E-04	3.06E-04	3.39E-04	2.69E-04	2.48E-04	2.86E-04	2.64E-04
SR-93	7.3 M	4.94E-04	4.84E-04	5.42E-04	6.19E-04	4.78E-04	4.37E-04	5.09E-04	4.69E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
KR-85	10.72 Y	5.27E-07	5.05E-07	5.42E-07	6.24E-07	5.55E-07	4.85E-07	4.35E-07	6.34E-07
KR-85M	4.48 H	3.75E-05	3.66E-05	4.01E-05	5.75E-05	3.84E-05	3.22E-05	3.09E-05	5.89E-05
KR-87	76.3 M	1.77E-04	1.67E-04	1.77E-04	1.91E-04	1.81E-04	1.53E-04	1.46E-04	1.94E-04
KR-88	2.84 H	4.30E-04	4.04E-04	4.25E-04	4.44E-04	4.31E-04	3.67E-04	3.52E-04	4.52E-04
KR-89	3.16 M	4.01E-04	3.78E-04	3.99E-04	4.26E-04	4.07E-04	3.50E-04	3.29E-04	4.33E-04
KR-90	32.32 S	2.83E-04	2.69E-04	2.86E-04	3.13E-04	2.88E-04	2.53E-04	2.33E-04	3.18E-04
RB-81	4.58 H	1.43E-04	1.38E-04	1.48E-04	1.79E-04	1.51E-04	1.30E-04	1.18E-04	1.82E-04
RB-82	1.25 M	2.58E-04	2.47E-04	2.65E-04	3.04E-04	2.71E-04	2.38E-04	2.13E-04	3.09E-04
RB-83	86.2 D	1.18E-04	1.13E-04	1.21E-04	1.39E-04	1.24E-04	1.09E-04	9.72E-05	1.41E-04
RB-84	32.9 D	2.11E-04	2.01E-04	2.15E-04	2.36E-04	2.18E-04	1.94E-04	1.73E-04	2.40E-04
RB-86	18.66 D	2.14E-05	2.03E-05	2.15E-05	2.29E-05	2.18E-05	1.95E-05	1.75E-05	2.33E-05
RB-87	4.73E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RB-88	17.8 M	1.40E-04	1.32E-04	1.39E-04	1.44E-04	1.41E-04	1.22E-04	1.15E-04	1.47E-04
RB-89	15.44 M	4.59E-04	4.33E-04	4.57E-04	4.80E-04	4.64E-04	4.06E-04	3.76E-04	4.88E-04
RB-90	157 S	4.37E-04	4.01E-04	4.18E-04	4.35E-04	4.36E-04	3.61E-04	3.57E-04	4.41E-04
RB-90M	258 S	7.07E-04	6.61E-04	6.95E-04	7.28E-04	7.12E-04	6.09E-04	5.79E-04	7.40E-04
SR-82	25.0 D	5.83E-09	8.75E-09	1.36E-07	1.34E-07	4.56E-08	7.26E-08	8.64E-08	2.22E-07
SR-85	64.84 D	1.21E-04	1.16E-04	1.24E-04	1.43E-04	1.27E-04	1.11E-04	9.95E-05	1.45E-04
SR-85M	67.66 M	5.12E-05	4.96E-05	5.39E-05	7.32E-05	5.44E-05	4.40E-05	4.26E-05	7.48E-05
SR-87M	2.805 H	7.60E-05	7.31E-05	7.88E-05	9.51E-05	8.13E-05	6.86E-05	6.32E-05	9.67E-05
SR-89	50.55 D	3.21E-08	3.04E-08	3.24E-08	3.49E-08	3.29E-08	2.95E-08	2.63E-08	3.55E-08
SR-90	28.6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SR-91	9.5 H	1.60E-04	1.52E-04	1.62E-04	1.75E-04	1.64E-04	1.47E-04	1.31E-04	1.78E-04
SR-92	2.71 H	2.86E-04	2.71E-04	2.87E-04	3.02E-04	2.90E-04	2.57E-04	2.35E-04	3.07E-04
SR-93	7.3 M	5.09E-04	4.83E-04	5.13E-04	5.57E-04	5.21E-04	4.58E-04	4.18E-04	5.66E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
KR-85	10.72 Y	8.32E-07	4.93E-07	4.98E-07	7.28E-07	5.51E-07	6.74E-07	4.41E-07	5.80E-07
KR-85M	4.48 H	6.09E-05	3.65E-05	3.62E-05	5.53E-05	4.23E-05	5.37E-05	3.23E-05	4.35E-05
KR-87	76.3 M	2.62E-04	1.61E-04	1.65E-04	2.32E-04	1.81E-04	2.14E-04	1.49E-04	1.87E-04
KR-88	2.84 H	6.25E-04	3.88E-04	3.96E-04	5.53E-04	4.36E-04	5.11E-04	3.63E-04	4.49E-04
KR-89	3.16 M	5.93E-04	3.65E-04	3.72E-04	5.25E-04	4.13E-04	4.87E-04	3.36E-04	4.23E-04
KR-90	32.32 S	4.32E-04	2.61E-04	2.64E-04	3.78E-04	2.98E-04	3.56E-04	2.38E-04	3.04E-04
RB-81	4.58 H	2.35E-04	1.35E-04	1.36E-04	2.01E-04	1.52E-04	1.87E-04	1.21E-04	1.60E-04
RB-82	1.25 M	4.08E-04	2.41E-04	2.44E-04	3.56E-04	2.71E-04	3.30E-04	2.16E-04	2.84E-04
RB-83	86.2 D	1.95E-04	1.10E-04	1.11E-04	1.63E-04	1.23E-04	1.51E-04	9.85E-05	1.30E-04
RB-84	32.9 D	3.35E-04	1.95E-04	1.98E-04	2.86E-04	2.24E-04	2.69E-04	1.75E-04	2.29E-04
RB-86	18.66 D	3.28E-05	1.96E-05	1.99E-05	2.84E-05	2.28E-05	2.71E-05	1.78E-05	2.29E-05
RB-87	4.73E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RB-88	17.8 M	2.06E-04	1.27E-04	1.29E-04	1.81E-04	1.43E-04	1.69E-04	1.18E-04	1.47E-04
RB-89	15.44 M	6.84E-04	4.17E-04	4.25E-04	5.99E-04	4.76E-04	5.62E-04	3.84E-04	4.85E-04
RB-90	157 S	6.05E-04	3.88E-04	4.02E-04	5.53E-04	4.37E-04	5.01E-04	3.55E-04	4.43E-04
RB-90M	258 S	1.03E-03	6.38E-04	6.54E-04	9.13E-04	7.23E-04	8.44E-04	5.86E-04	7.37E-04
SR-82	25.0 D	9.53E-06	5.15E-08	5.26E-08	9.67E-07	1.71E-09	1.58E-07	4.80E-11	9.90E-07
SR-85	64.84 D	2.00E-04	1.13E-04	1.14E-04	1.67E-04	1.26E-04	1.54E-04	1.01E-04	1.34E-04
SR-85M	67.66 M	8.28E-05	4.94E-05	4.90E-05	7.39E-05	5.61E-05	7.07E-05	4.39E-05	5.83E-05
SR-87M	2.805 H	1.22E-04	7.19E-05	7.22E-05	1.06E-04	8.00E-05	9.88E-05	6.43E-05	8.46E-05
SR-89	50.55 D	4.96E-08	2.95E-08	3.01E-08	4.29E-08	3.42E-08	4.09E-08	2.65E-08	3.45E-08
SR-90	28.6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SR-91	9.5 H	2.47E-04	1.47E-04	1.50E-04	2.14E-04	1.70E-04	2.03E-04	1.32E-04	1.72E-04
SR-92	2.71 H	4.32E-04	2.62E-04	2.65E-04	3.76E-04	3.01E-04	3.56E-04	2.41E-04	3.04E-04
SR-93	7.3 M	7.77E-04	4.68E-04	4.75E-04	6.78E-04	5.33E-04	6.37E-04	4.26E-04	5.46E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
Y-86	14.74 H	7.88E-04	7.75E-04	8.69E-04	9.86E-04	7.66E-04	7.00E-04	8.14E-04	7.51E-04
Y-87	80.3 H	1.10E-04	1.04E-04	1.16E-04	1.45E-04	1.02E-04	9.15E-05	1.08E-04	9.99E-05
Y-88	106.60 D	5.62E-04	5.66E-04	6.35E-04	7.13E-04	5.63E-04	5.19E-04	5.99E-04	5.52E-04
Y-90	64.1 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Y-90M	3.19 H	1.55E-04	1.45E-04	1.60E-04	2.06E-04	1.42E-04	1.27E-04	1.50E-04	1.40E-04
Y-91	58.51 D	7.59E-07	7.52E-07	8.48E-07	9.37E-07	7.44E-07	6.84E-07	7.92E-07	7.29E-07
Y-91M	49.71 M	1.27E-04	1.21E-04	1.35E-04	1.59E-04	1.18E-04	1.07E-04	1.26E-04	1.16E-04
Y-92	3.54 H	5.59E-05	5.47E-05	6.15E-05	6.89E-05	5.40E-05	4.93E-05	5.75E-05	5.29E-05
Y-93	10.1 H	1.95E-05	1.91E-05	2.13E-05	2.50E-05	1.89E-05	1.74E-05	2.01E-05	1.86E-05
ZR-86	16.5 H	6.87E-05	6.29E-05	6.78E-05	1.08E-04	6.11E-05	5.48E-05	6.49E-05	6.10E-05
ZR-88	83.4 D	9.44E-05	8.80E-05	9.70E-05	1.28E-04	8.59E-05	7.71E-05	9.09E-05	8.48E-05
ZR-89	78.43 H	2.68E-04	2.59E-04	2.91E-04	3.34E-04	2.55E-04	2.31E-04	2.72E-04	2.50E-04
ZR-93	1.53E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZR-95	64.02 D	1.74E-04	1.67E-04	1.88E-04	2.13E-04	1.65E-04	1.49E-04	1.75E-04	1.61E-04
ZR-97	16.90 H	4.00E-05	3.90E-05	4.37E-05	5.01E-05	3.85E-05	3.51E-05	4.09E-05	3.78E-05
NB-90	14.60 H	8.67E-04	8.71E-04	9.73E-04	1.11E-03	8.67E-04	8.00E-04	9.21E-04	8.51E-04
NB-91	1E4 Y	6.57E-07	3.88E-07	4.69E-07	7.06E-06	4.33E-07	3.51E-07	4.04E-07	5.20E-07
NB-91M	61 D	9.24E-06	8.93E-06	1.01E-05	1.64E-05	8.88E-06	8.12E-06	9.41E-06	8.79E-06
NB-92	3.6E7 Y	3.49E-04	3.36E-04	3.78E-04	4.36E-04	3.31E-04	3.00E-04	3.52E-04	3.24E-04
NB-92M	10.15 D	2.20E-04	2.14E-04	2.41E-04	2.75E-04	2.11E-04	1.92E-04	2.25E-04	2.07E-04
NB-93M	14.6 Y	5.06E-08	2.79E-09	9.71E-09	1.15E-06	1.28E-08	4.17E-09	3.66E-09	3.17E-08
NB-94	2.03E4 Y	3.70E-04	3.57E-04	4.01E-04	4.53E-04	3.52E-04	3.18E-04	3.74E-04	3.44E-04
NB-94M	6.26 M	1.16E-06	9.47E-07	1.09E-06	5.55E-06	9.70E-07	8.52E-07	9.96E-07	1.02E-06
NB-95	35.06 D	1.81E-04	1.74E-04	1.96E-04	2.21E-04	1.71E-04	1.55E-04	1.82E-04	1.68E-04
NB-95M	86.6 H	1.52E-05	1.37E-05	1.48E-05	2.52E-05	1.34E-05	1.20E-05	1.41E-05	1.34E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
Y-86	14.74 H	8.14E-04	7.73E-04	8.21E-04	8.84E-04	8.33E-04	7.34E-04	6.69E-04	8.99E-04
Y-87	80.3 H	1.08E-04	1.04E-04	1.11E-04	1.29E-04	1.14E-04	9.93E-05	8.93E-05	1.32E-04
Y-88	106.60 D	5.99E-04	5.67E-04	5.99E-04	6.26E-04	6.05E-04	5.29E-04	4.92E-04	6.36E-04
Y-90	64.1 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Y-90M	3.19 H	1.50E-04	1.45E-04	1.56E-04	1.92E-04	1.59E-04	1.35E-04	1.24E-04	1.96E-04
Y-91	58.51 D	7.91E-07	7.50E-07	7.95E-07	8.38E-07	8.02E-07	7.17E-07	6.49E-07	8.52E-07
Y-91M	49.71 M	1.26E-04	1.20E-04	1.29E-04	1.47E-04	1.32E-04	1.16E-04	1.03E-04	1.49E-04
Y-92	3.54 H	5.74E-05	5.45E-05	5.79E-05	6.22E-05	5.87E-05	5.23E-05	4.71E-05	6.33E-05
Y-93	10.1 H	2.01E-05	1.91E-05	2.03E-05	2.24E-05	2.06E-05	1.78E-05	1.66E-05	2.28E-05
ZR-86	16.5 H	6.53E-05	6.25E-05	6.82E-05	8.90E-05	6.89E-05	5.67E-05	5.40E-05	9.10E-05
ZR-88	83.4 D	9.10E-05	8.75E-05	9.45E-05	1.14E-04	9.73E-05	8.23E-05	7.57E-05	1.16E-04
ZR-89	78.43 H	2.71E-04	2.58E-04	2.75E-04	3.00E-04	2.79E-04	2.49E-04	2.22E-04	3.05E-04
ZR-93	1.53E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZR-95	64.02 D	1.75E-04	1.66E-04	1.78E-04	1.95E-04	1.81E-04	1.62E-04	1.43E-04	1.98E-04
ZR-97	16.90 H	4.09E-05	3.89E-05	4.14E-05	4.53E-05	4.21E-05	3.70E-05	3.36E-05	4.61E-05
NB-90	14.60 H	9.26E-04	8.73E-04	9.23E-04	9.82E-04	9.35E-04	8.05E-04	7.58E-04	9.99E-04
NB-91	1E4 Y	4.46E-07	4.16E-07	6.73E-07	7.83E-07	5.06E-07	5.17E-07	4.83E-07	9.12E-07
NB-91M	61 D	9.44E-06	8.93E-06	9.67E-06	1.03E-05	9.57E-06	8.63E-06	7.82E-06	1.06E-05
NB-92	3.6E7 Y	3.51E-04	3.34E-04	3.57E-04	3.92E-04	3.63E-04	3.24E-04	2.89E-04	3.99E-04
NB-92M	10.15 D	2.24E-04	2.13E-04	2.27E-04	2.43E-04	2.29E-04	2.06E-04	1.84E-04	2.47E-04
NB-93M	14.6 Y	1.57E-08	9.27E-09	5.41E-08	6.72E-08	1.83E-08	3.20E-08	3.10E-08	8.89E-08
NB-94	2.03E4 Y	3.73E-04	3.55E-04	3.79E-04	4.13E-04	3.85E-04	3.45E-04	3.06E-04	4.20E-04
NB-94M	6.26 M	1.04E-06	9.65E-07	1.20E-06	1.33E-06	1.07E-06	1.02E-06	9.19E-07	1.43E-06
NB-95	35.06 D	1.82E-04	1.73E-04	1.85E-04	2.02E-04	1.88E-04	1.68E-04	1.49E-04	2.05E-04
NB-95M	86.6 H	1.42E-05	1.37E-05	1.50E-05	2.01E-05	1.51E-05	1.23E-05	1.18E-05	2.05E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
Y-86	14.74 H	1.25E-03	7.48E-04	7.60E-04	1.08E-03	8.53E-04	1.02E-03	6.82E-04	8.73E-04
Y-87	80.3 H	1.81E-04	1.01E-04	1.02E-04	1.51E-04	1.13E-04	1.39E-04	9.06E-05	1.20E-04
Y-88	106.60 D	9.02E-04	5.45E-04	5.55E-04	7.82E-04	6.19E-04	7.31E-04	5.06E-04	6.34E-04
Y-90	64.1 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Y-90M	3.19 H	2.39E-04	1.42E-04	1.43E-04	2.11E-04	1.60E-04	1.98E-04	1.27E-04	1.68E-04
Y-91	58.51 D	1.20E-06	7.25E-07	7.34E-07	1.05E-06	8.38E-07	9.94E-07	6.62E-07	8.44E-07
Y-91M	49.71 M	1.98E-04	1.17E-04	1.19E-04	1.73E-04	1.32E-04	1.61E-04	1.05E-04	1.38E-04
Y-92	3.54 H	8.81E-05	5.27E-05	5.36E-05	7.65E-05	6.08E-05	7.25E-05	4.78E-05	6.16E-05
Y-93	10.1 H	3.05E-05	1.85E-05	1.88E-05	2.68E-05	2.10E-05	2.52E-05	1.70E-05	2.16E-05
ZR-86	16.5 H	1.24E-04	6.20E-05	6.19E-05	9.58E-05	7.02E-05	8.86E-05	5.50E-05	7.60E-05
ZR-88	83.4 D	1.55E-04	8.61E-05	8.65E-05	1.28E-04	9.57E-05	1.18E-04	7.69E-05	1.02E-04
ZR-89	78.43 H	4.29E-04	2.50E-04	2.55E-04	3.66E-04	2.88E-04	3.46E-04	2.25E-04	2.94E-04
ZR-93	1.53E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZR-95	64.02 D	2.73E-04	1.62E-04	1.65E-04	2.36E-04	1.86E-04	2.24E-04	1.45E-04	1.90E-04
ZR-97	16.90 H	6.28E-05	3.77E-05	3.82E-05	5.48E-05	4.30E-05	5.16E-05	3.43E-05	4.41E-05
NB-90	14.60 H	1.37E-03	8.41E-04	8.57E-04	1.21E-03	9.49E-04	1.12E-03	7.80E-04	9.78E-04
NB-91	1E4 Y	1.11E-05	4.85E-07	4.98E-07	2.20E-06	4.30E-07	9.02E-07	3.32E-07	1.89E-06
NB-91M	61 D	2.24E-05	8.70E-06	8.83E-06	1.39E-05	9.97E-06	1.22E-05	7.84E-06	1.12E-05
NB-92	3.6E7 Y	5.57E-04	3.25E-04	3.30E-04	4.76E-04	3.73E-04	4.49E-04	2.91E-04	3.82E-04
NB-92M	10.15 D	3.57E-04	2.06E-04	2.10E-04	3.01E-04	2.39E-04	2.86E-04	1.85E-04	2.42E-04
NB-93M	14.6 Y	1.78E-06	2.44E-08	2.66E-08	3.22E-07	5.04E-09	8.64E-08	2.52E-10	2.69E-07
NB-94	2.03E4 Y	5.81E-04	3.44E-04	3.51E-04	5.03E-04	3.97E-04	4.77E-04	3.08E-04	4.04E-04
NB-94M	6.26 M	8.31E-06	9.93E-07	1.02E-06	2.54E-06	1.07E-06	1.58E-06	8.09E-07	2.08E-06
NB-95	35.06 D	2.84E-04	1.68E-04	1.71E-04	2.45E-04	1.93E-04	2.33E-04	1.50E-04	1.97E-04
NB-95M	86.6 H	2.88E-05	1.36E-05	1.36E-05	2.14E-05	1.54E-05	1.96E-05	1.21E-05	1.69E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
NB-96	23.35 H	5.68E-04	5.50E-04	6.17E-04	7.01E-04	5.41E-04	4.91E-04	5.76E-04	5.30E-04
NB-97	72.1 M	1.58E-04	1.52E-04	1.70E-04	1.95E-04	1.49E-04	1.34E-04	1.58E-04	1.46E-04
NB-97M	60 S	1.73E-04	1.66E-04	1.86E-04	2.12E-04	1.63E-04	1.48E-04	1.74E-04	1.60E-04
MO-91	15.49 M	2.34E-04	2.22E-04	2.48E-04	2.95E-04	2.17E-04	1.95E-04	2.30E-04	2.13E-04
MO-93	3.5E3 Y	2.83E-07	1.57E-08	5.44E-08	6.42E-06	7.18E-08	2.34E-08	2.05E-08	1.78E-07
MO-99	66.02 H	3.69E-05	3.53E-05	3.93E-05	4.69E-05	3.47E-05	3.12E-05	3.69E-05	3.40E-05
MO-101	14.61 M	3.26E-04	3.21E-04	3.59E-04	4.10E-04	3.17E-04	2.90E-04	3.37E-04	3.11E-04
TC-95	20.0 H	1.85E-04	1.78E-04	2.00E-04	2.33E-04	1.76E-04	1.59E-04	1.87E-04	1.72E-04
TC-95M	61 D	1.59E-04	1.51E-04	1.68E-04	2.09E-04	1.48E-04	1.34E-04	1.58E-04	1.46E-04
TC-96	4.28 D	5.83E-04	5.63E-04	6.33E-04	7.20E-04	5.56E-04	5.03E-04	5.91E-04	5.44E-04
TC-96M	51.5 M	9.53E-06	9.11E-06	1.02E-05	1.52E-05	9.01E-06	8.17E-06	9.59E-06	8.90E-06
TC-97	2.6E6 Y	3.40E-07	3.83E-08	7.30E-08	6.75E-06	9.37E-08	3.93E-08	5.68E-08	2.21E-07
TC-97M	89 D	3.72E-07	1.31E-07	1.47E-07	5.36E-06	1.58E-07	1.06E-07	1.67E-07	2.66E-07
TC-98	4.2E6 Y	3.32E-04	3.18E-04	3.57E-04	4.08E-04	3.13E-04	2.82E-04	3.33E-04	3.06E-04
TC-99	2.13E5 Y	1.21E-10	1.21E-10	1.25E-10	2.31E-10	1.14E-10	9.93E-11	1.23E-10	1.09E-10
TC-99M	6.02 H	3.18E-05	2.93E-05	3.14E-05	5.11E-05	2.89E-05	2.51E-05	3.09E-05	2.83E-05
TC-101	14.2 M	8.52E-05	7.90E-05	8.64E-05	1.13E-04	7.72E-05	6.93E-05	8.17F-05	7.63E-05
RU-97	2.9 D	5.78E-05	5.26E-05	5.66E-05	8.80E-05	5.13E-05	4.59E-05	5.43E-05	5.12E-05
RU-103	39.35 D	1.16E-04	1.10E-04	1.23E-04	1.47E-04	1.08E-04	9.68E-05	1.14E-04	1.06E-04
RU-105	4.44 H	1.87E-04	1.79E-04	2.00E-04	2.34E-04	1.76E-04	1.58E-04	1.87E-04	1.72E-04
RU-106	368.2 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RH-103M	56.119 M	7.52E-08	3.53E-08	2.34E-08	1.04E-06	2.72E-08	2.00E-08	5.50E-08	5.34E-08
RH-105	35.36 H	1.94E-05	1.79E-05	1.96E-05	2.59E-05	1.75E-05	1.57E-05	1.85E-05	1.73E-05
RH-105M	45 S	7.03E-06	6.33E-06	6.70E-06	1.63E-05	6.21E-06	5.[illegible]6E-06	6.79E-06	6.19E-06
RH-106	29.92 S	4.88E-05	4.67E-05	5.22E-05	6.09E-05	4.58E-05	4.13E-05	4.87E-05	4.49E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
NB-96	23.35 H	5.75E-04	5.47E-04	5.83E-04	6.38E-04	5.93E-04	5.28E-04	4.72E-04	6.49E-04
NB-97	72.1 M	1.58E-04	1.51E-04	1.61E-04	1.79E-04	1.64E-04	1.46E-04	1.30E-04	1.82E-04
NB-97M	60 S	1.73E-04	1.65E-04	1.76E-04	1.93E-04	1.79E-04	1.60E-04	1.42E-04	1.97E-04
MO-91	15.49 M	2.30E-04	2.21E-04	2.37E-04	2.72E-04	2.42E-04	2.12E-04	1.90E-04	2.77E-04
MO-93	3.5E3 Y	8.83E-08	5.20E-08	3.03E-07	3.76E-07	1.02E-07	1.79E-07	1.74E-07	4.98E-07
MO-99	66.02 H	3.67E-05	3.50E-05	3.76E-05	4.29E-05	3.79E-05	3.36E-05	3.01E-05	4.37E-05
MO-101	14.61 M	3.37E-04	3.20E-04	3.40E-04	3.69E-04	3.44E-04	3.02E-04	2.77E-04	3.75E-04
TC-95	20.0 H	1.86E-04	1.77E-04	1.89E-04	2.07E-04	1.92E-04	1.72E-04	1.5[illegible]E-04	2.10E-04
TC-95M	61 D	1.57E-04	1.50E-04	1.61E-04	1.87E-04	1.63E-04	1.43E-04	1.29E-04	1.90E-04
TC-96	4.28 D	5.90E-04	5.60E-04	5.98E-04	6.50E-04	6.07E-04	5.44E-04	4.83E-04	6.61E-04
TC-96M	51.5 M	9.65E-06	9.08E-06	9.85E-06	1.07E-05	9.83E-06	8.86E-06	7.92E-06	1.09E-05
TC-97	2.6E6 Y	1.66E-07	8.03E-08	3.73E-07	4.85E-07	1.26E-07	2.26E-07	2.08E-07	6.15E-07
TC-97M	89 D	2.83E-07	1.60E-07	4.14E-07	5.86E-07	1.75E-07	2.69E-07	2.37E-07	6.90E-07
TC-98	4.2E6 Y	3.32E-04	3.16E-04	3.38E-04	3.73E-04	3.44E-04	3.07E-04	2.72E-04	3.80E-04
TC-99	2.13E5 Y	1.23E-10	1.20E-10	1.33E-10	2.26E-10	9.78E-11	1.01E-10	8.92E-11	2.33E-10
TC-99M	6.02 H	2.98E-05	2.93E-05	3.23E-05	4.92E-05	2.94E-05	2.53E-05	2.43E-05	5.06E-05
TC-101	14.2 M	8.16E-05	7.86E-05	8.49E-05	1.06E-04	8.73E-05	7.26E-05	6.79E-05	1.08E-04
RU-97	2.9 D	5.44E-05	5.24E-05	5.73E-05	7.67E-05	5.76E-05	4.69E-05	4.52E-05	7.85E-05
RU-103	39.35 D	1.14E-04	1.10E-04	1.18E-04	1.36E-04	1.20E-04	1.05E-04	9.43E-05	1.38E-04
RU-105	4.44 H	1.86E-04	1.78E-04	1.90E-04	2.15E-04	1.94E-04	1.71E-04	1.53E-04	2.19E-04
RU-106	368.2 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RH-103M	56.119 M	9.04E-08	3.37E-08	8.84E-08	1.28E-07	3.05E-08	5.76E-08	4.62E-08	1.48E-07
RH-105	35.36 H	1.85E-05	1.79E-05	1.93E-05	2.42E-05	1.99E-05	1.64E-05	1.54E-05	2.47E-05
RH-105M	45 S	6.71E-06	6.32E-06	7.25E-06	1.12E-05	6.19E-06	5.61E-06	5.28E-06	1.16E-05
RH-106	29.92 S	4.86E-05	4.64E-05	4.97E-05	5.60E-05	5.07E-05	4.47E-05	4.00E-05	5.69E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
NB-96	23.35 H	8.92E-04	5.31E-04	5.39E-04	7.74E-04	6.09E-04	7.32E-04	4.78E-04	6.22E-04
NB-97	72.1 M	2.48E-04	1.46E-04	1.49E-04	2.15E-04	1.67E-04	2.02E-04	1.31E-04	1.72E-04
NB-97M	60 S	2.71E-04	1.60E-04	1.63E-04	2.34E-04	1.84E-04	2.22E-04	1.43E-04	1.88E-04
MO-91	15.49 M	3.64E-04	2.16E-04	2.18E-04	3.18E-04	2.41E-04	2.94E-04	1.93E-04	2.54E-04
MO-93	3.5E3 Y	9.97E-06	1.37E-07	1.49E-07	1.80E-06	2.83E-08	4.84E-07	1.41E-09	1.51E-06
MO-99	66.02 H	5.80E-05	3.41E-05	3.47E-05	5.03E-05	3.93E-05	4.77E-05	3.05E-05	4.02E-05
MO-101	14.61 M	5.14E-04	3.10E-04	3.14E-04	4.49E-04	3.53E-04	4.22E-04	2.83E-04	3.62E-04
TC-95	20.0 H	3.00E-04	1.72E-04	1.75E-04	2.53E-04	1.98E-04	2.39E-04	1.54E-04	2.03E-04
TC-95M	61 D	2.56E-04	1.47E-04	1.49E-04	2.18E-04	1.68E-04	2.05E-04	1.31E-04	1.74E-04
TC-96	4.28 D	9.26E-04	5.43E-04	5.54E-04	7.94E-04	6.28E-04	7.54E-04	4.87E-04	6.39E-04
TC-96M	51.5 M	2.01E-05	8.86E-06	9.02E-06	1.40E-05	1.01E-05	1.25E-05	7.89E-06	1.12E-05
TC-97	2.6E6 Y	1.02E-05	1.75E-07	1.94E-07	2.11E-06	5.40E-08	6.36E-07	3.61E-09	1.68E-06
TC-97M	89 D	7.74E-06	2.33E-07	2.53E-07	1.91E-06	1.60E-07	7.17E-07	6.71E-08	1.47E-06
TC-98	4.2E6 Y	5.19E-04	3.07E-04	3.13E-04	4.50E-04	3.52E-04	4.24E-04	2.75E-04	3.61E-04
TC-99	2.13E5 Y	2.09E-10	1.16E-10	1.16E-10	1.96E-10	1.52E-10	1.96E-10	1.01E-10	1.49E-10
TC-99M	6.02 H	4.92E-05	2.92E-05	2.90E-05	4.52E-05	3.47E-05	4.45E-05	2.57E-05	3.53E-05
TC-101	14.2 M	1.29E-04	7.76E-05	7.77E-05	1.15E-04	8.70E-05	1.08E-04	6.93E-05	9.11E-05
RU-97	2.9 D	9.66E-05	5.22E-05	5.19E-05	8.01E-05	5.91E-05	7.50E-05	4.63E-05	6.32E-05
RU-103	39.35 D	1.81E-04	1.07E-04	1.08E-04	1.58E-04	1.19E-04	1.46E-04	9.57E-05	1.26E-04
RU-105	4.44 H	2.92E-04	1.73E-04	1.76E-04	2.54E-04	1.97E-04	2.39E-04	1.55E-04	2.03E-04
RU-106	368.2 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RH-103M	56.119 M	1.44E-06	4.65E-08	5.27E-08	4.21E-07	3.64E-08	1.71E-07	6.28E-09	3.04E-07
RH-105	35.36 H	2.93E-05	1.77E-05	1.76E-05	2.61E-05	1.97E-05	2.45E-05	1.58E-05	2.07E-05
RH-105M	45 S	1.78E-05	6.37E-06	6.36E-06	1.17E-05	7.53E-06	1.03E-05	5.40E-06	9.03E-06
RH-106	29.92 S	7.62E-05	4.52E-05	4.58E-05	6.64E-05	5.11E-05	6.20E-05	4.06E-05	5.31E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
PD-103	16.961 D	6.72E-07	2.95E-07	2.12E-07	9.25E-06	2.45E-07	1.75E-07	4.85E-07	4.78E-07
PD-107	6.5E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PD-109	13.453 H	1.65E-07	1.57E-07	1.75E-07	2.08E-07	1.53E-07	1.38E-07	1.63E-07	1.50E-07
AG-106M	8.46 D	6.35E-04	6.15E-04	6.89E-04	7.98E-04	6.05E-04	5.50E-04	6.44E-04	5.94E-04
AG-108	2.37 M	4.19E-06	3.98E-06	4.45E-06	5.39E-06	3.90E-06	3.52E-06	4.15E-06	3.83E-06
AG-108M	127 Y	3.85E-04	3.67E-04	4.10E-04	4.88E-04	3.60E-04	3.24E-04	3.83E-04	3.53F-04
AG-109M	39.6 S	1.12E-06	1.02E-06	9.12E-07	5.64E-06	8.58E-07	7.46E-07	1.15E-06	9.50E-07
AG-110	24.57 S	7.27E-06	6.96E-06	7.80E-06	8.98E-06	6.83E-06	6.16E-06	7.27E-06	6.69E-06
AG-110M	249.85 D	6.21E-04	6.03E-04	6.78E-04	7.64E-04	5.95E-04	5.41E-04	6.33E-04	5.83E-04
AG-111	7.46 D	6.57E-06	[illegible]	6.65E-06	8.72E-06	5.93E-06	5.33E-06	6.28E-06	5.87E-06
CD-109	464 D	6.74E-07	4.81E-07	2.29E-07	7.86E-06	2.62E-07	2.23E-07	7.20F-07	4.94E-07
CD-111M	48.7 M	7.06E-05	6.45E-05	6.92E-05	1.04E-04	6.28E-05	5.61E-05	6.69E-05	6.25E-05
CD-113	9.3E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-113M	13.7 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-115	53.46 H	4.89E-05	4.64E-05	5.16E-05	6.21E-05	4.53E-05	4.08E-05	4.81E-05	4.45E-05
CD-115M	44.6 D	4.86E-06	4.75E-06	5.35E-06	5.97E-06	4.70E-06	4.29E-06	5.00E-06	4.60E-06
CD-117	2.49 H	2.35E-04	2.31E-04	2.58E-04	2.97E-04	2.28E-04	2.09E-04	2.42E-04	2.24E-04
CD-117M	3.36 H	4.28E-04	4.29E-04	4.81E-04	5.39E-04	4.27E-04	3.93E-04	4.54E-04	4.18E-04
IN-111	2.83 D	9.85E-05	8.99E-05	9.62E-05	1.49E-04	8.76E-05	7.79E-05	9.35E-05	8.72E-05
IN-113M	1.658 H	6.29E-05	5.88E-05	6.46E-05	8.34E-05	5.72E-05	5.14E-05	6.08E-05	5.65E-05
IN-114	71.9 S	7.52E-06	7.19E-06	8.04E-06	9.44E-06	7.05E-06	6.36E-06	7.49E-06	6.90E-06
IN-114M	49.51 D	2.18E-05	2.05E-05	2.24E-05	3.20E-05	1.99E-05	1.79E-05	2.15E-05	1.97E-05
IN-115	4.6E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IN-115M	4.36 H	3.96E-05	3.67E-05	3.99E-05	5.51E-05	3.56E-05	3.20E-05	3.80E-05	3.53E-05
IN-116M	54.15 M	5.17E-04	5.14E-04	5.78E-04	6.45E-04	5.09E-04	4.68E-04	5.42E-04	4.99E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
PD-103	16.961 D	7.78E-07	2.90E-07	7.81E-07	1.11E-06	2.85E-07	5.11E-07	4.17E-07	1.28E-06
PD-107	6.5E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PD-109	13.453 H	1.63E-07	1.56E-07	1.67E-07	1.93E-07	1.71E-07	1.50E-07	1.34E-07	1.96E-07
AG-106M	8.46 D	6.43E-04	6.12E-04	6.53E-04	7.19E-04	6.64E-04	5.87E-04	5.29E-04	7.31E-04
AG-108	2.37 M	4.16E-06	3.96E-06	4.25E-06	4.81E-06	4.33E-06	3.83E-06	3.41E-06	4.89E-06
AG-108M	127 Y	3.82E-04	3.65E-04	3.91E-04	4.43E-04	3.99E-04	3.52E-04	3.14E-04	4.50E-04
AG-109M	39.6 S	1.36E-06	9.57E-07	1.28E-06	2.09E-06	7.61E-07	9.29E-07	7.80E-07	2.20E-06
AG-110	24.57 S	7.25E-06	6.91E-06	7.40E-06	8.22E-06	7.54E-06	6.71E-06	5.96E-06	8.36E-06
AG-110M	249.85 D	6.32E-04	6.00E-04	6.40E-04	6.93E-04	6.49E-04	5.79E-04	5.18E-04	7.05E-04
AG-111	7.46 D	6.28E-06	6.05E-06	6.54E-06	8.15E-06	6.74E-06	5.59E-06	5.23E-06	8.30E-06
CD-109	464 D	1.09E-06	3.67E-07	8.15E-07	1.23E-06	2.81E-07	5.44E-07	4.13E-07	1.37E-06
CD-111M	48.7 M	6.67E-05	6.42E-05	7.00E-05	9.50E-05	7.01E-05	5.72E-05	5.51E-05	9.72E-05
CD-113	9.3E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-113M	13.7 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-115	53.46 H	4.82E-05	4.61E-05	4.95E-05	5.72E-05	5.06E-05	4.42E-05	3.97E-05	5.82E-05
CD-115M	44.6 D	4.99E-06	4.73E-06	5.03E-06	5.38E-06	5.09E-06	4.56E-06	4.09E-06	5.48E-06
CD-117	2.49 H	2.42E-04	2.30E-04	2.45E-04	2.67E-04	2.48E-04	2.17E-04	1.99E-04	2.72E-04
CD-117M	3.36 H	4.55E-04	4.30E-04	4.54E-04	4.78E-04	4.60E-04	4.01E-04	3.73E-04	4.86E-04
IN-111	2.83 D	9.31E-05	8.94E-05	9.78E-05	1.35E-04	9.69E-05	7.94E-05	7.66E-05	1.38E-04
IN-113M	1.658 H	6.10E-05	5.84E-05	6.30E-05	7.60E-05	6.48E-05	5.49E-05	5.04E-05	7.73E-05
IN-114	71.9 S	7.49E-06	7.15E-06	7.66E-06	8.63E-06	7.81E-06	6.90E-06	6.16E-06	8.77E-06
IN-114M	49.51 D	2.16E-05	2.03E-05	2.21E-05	2.71E-05	2.19E-05	1.91E-05	1.74E-05	2.77E-05
IN-115	4.6E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IN-115M	4.36 H	3.82E-05	3.64E-05	3.95E-05	4.91E-05	4.05E-05	3.37E-05	3.15E-05	5.00E-05
IN-116M	54.15 M	5.41E-04	5.13E-04	5.44E-04	5.76E-04	5.58E-04	4.86E-04	4.45E-04	5.86E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
PD-103	16.961 D	1.28E-05	4.13E-07	4.66E-07	3.73E-06	2.94E-07	1.49E-06	5.41E-08	2.70E-06
PD-107	6.5E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PD-109	13.453 H	2.57E-07	1.52E-07	1.54E-07	2.25E-07	1.70E-07	2.08E-07	1.36E-07	1.79E-07
AG-106M	8.46 D	1.01E-03	5.94E-04	6.03E-04	8.70E-04	6.78E-04	8.17E-04	5.37E-04	6.98E-04
AG-108	2.37 M	6.76E-06	3.86E-06	3.92E-06	5.74E-06	4.36E-06	5.33E-06	3.45E-06	4.58E-06
AG-108M	127 Y	6.11E-04	3.55E-04	3.61E-04	5.26E-04	4.03E-04	4.91E-04	3.18E-04	4.20E-04
AG-109M	39.6 S	6.81E-06	9.64E-07	1.00E-06	3.15E-06	1.20E-06	2.12E-06	6.72E-07	2.27E-06
AG-110	24.57 S	1.14E-05	6.72E-06	6.84E-06	9.87E-06	7.66E-06	9.28E-06	6.01E-06	7.91E-06
AG-110M	249.85 D	9.77E-04	5.82E-04	5.92E-04	8.47E-04	6.69E-04	8.02E-04	5.25E-04	6.81E-04
AG-111	7.46 D	9.95E-06	5.98E-06	5.98E-06	8.85E-06	6.67E-06	8.29E-06	5.34E-06	7.02E-06
CD-109	464 D	1.03E-05	4.44E-07	5.08E-07	3.60E-06	4.41E-07	1.65E-06	6.73E-08	2.50E-06
CD-111M	48.7 M	1.11E-04	6.39E-05	6.35E-05	9.72E-05	7.26E-05	9.21E-05	5.66E-05	7.65E-05
CD-113	9.3E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-113M	13.7 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD-115	53.46 H	7.64E-05	4.50E-05	4.55E-05	6.66E-05	5.04E-05	6.17E-05	4.03E-05	5.31E-05
CD-115M	44.6 D	7.66E-06	4.58E-06	4.66E-06	6.64E-06	5.30E-06	6.32E-06	4.15E-06	5.35E-06
CD-117	2.49 H	3.70E-04	2.23E-04	2.26E-04	3.23E-04	2.55E-04	3.05E-04	2.04E-04	2.60E-04
CD-117M	3.36 H	6.78E-04	4.14E-04	4.21E-04	5.93E-04	4.70E-04	5.55E-04	3.83E-04	4.81E-04
IN-111	2.83 D	1.57E-04	8.91E-05	8.86E-05	1.37E-04	1.02E-04	1.30E-04	7.88E-05	1.07E-04
IN-113M	1.658 H	9.86E-05	5.74E-05	5.76E-05	8.57E-05	6.38E-05	7.92E-05	5.12E-05	6.80E-05
IN-114	71.9 S	1.18E-05	6.96E-06	7.06E-06	1.03E-05	7.86E-06	9.56E-06	6.23E-06	8.20E-06
IN-114M	49.51 D	3.77E-05	1.99E-05	2.01E-05	3.11E-05	2.28E-05	2.87E-05	1.76E-05	2.45E-05
IN-115	4.6E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IN-115M	4.36 H	6.35E-05	3.59E-05	3.60E-05	5.45E-05	4.01E-05	5.03E-05	3.20E-05	4.30E-05
IN-116M	54.15 M	8.19E-04	4.96E-04	5.03E-04	7.14E-04	5.68E-04	6.74E-04	4.55E-04	5.77E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
IN-117	43.8 M	1.67E-04	1.58E-04	1.74E-04	2.19E-04	1.54E-04	1.38E-04	1.64E-04	1.51E-04
IN-117M	116.5 M	2.21E-05	2.04E-05	2.19E-05	3.24E-05	1.98E-05	1.77E-05	2.12E-05	1.96E-05
SN-113	115.1 D	2.02E-06	1.92E-06	1.54E-06	9.06E-06	1.45E-06	1.33E-06	2.16E-06	1.69E-06
SN-117M	13.60 D	3.66E-05	3.37E-05	3.55E-05	6.11E-05	3.27E-05	2.87E-05	3.54E-05	3.24E-05
SN-119M	293.0 D	4.80E-07	5.11E-07	2.04E-07	4.40E-06	2.20E-07	2.21E-07	6.13E-07	3.68E-07
SN-123	129.2 D	1.51E-06	1.48E-06	1.67E-06	1.85E-06	1.47E-06	1.34E-06	1.56E-06	1.44E-06
SN-125	9.64 D	6.69E-05	6.58E-05	7.39E-05	8.26E-05	6.51E-05	5.95E-05	6.93E-05	6.38E-05
SN-126	1.0E5 Y	1.11E-05	1.14E-05	1.13E-05	2.49E-05	1.03E-05	9.04E-06	1.13E-05	9.95E-06
SB-117	2.80 H	4.22E-05	3.91E-05	4.15E-05	6.92E-05	3.79E-05	3.34E-05	4.10E-05	3.75E-05
SB-122	2.70 D	1.06E-04	1.01E-04	1.13E-04	1.32E-04	9.87E-05	8.89E-05	1.05E-04	9.67E-05
SB-124	60.20 D	4.03E-04	3.99E-04	4.47E-04	5.05E-04	3.94E-04	3.61E-04	4.19E-04	3.86E-04
SB-125	2.77 Y	1.02E-04	9.68E-05	1.07E-04	1.33E-04	9.41E-05	8.48E-05	1.00E-04	9.26E-05
SB-126	12.4 D	6.55E-04	6.27E-04	7.02E-04	8.11E-04	6.16E-04	5.56E-04	6.54E-04	6.03E-04
SB-126M	19.0 M	3.76E-04	3.59E-04	4.01E-04	4.68E-04	3.52E-04	3.18E-04	3.74E-04	3.45E-04
SB-127	3.85 D	1.58E-04	1.51E-04	1.68E-04	1.97E-04	1.48E-04	1.33E-04	1.57E-04	1.45E-04
SB-129	4.40 H	3.24E-04	3.16E-04	3.55E-04	4.01E-04	3.12E-04	2.84E-04	3.32E-04	3.05E-04
TE-121	16.8 D	1.34E-04	1.28E-04	1.42E-04	1.74E-04	1.25E-04	1.12E-04	1.33E-04	1.23E-04
TE-121M	154 D	5.10E-05	4.73E-05	5.03E-05	7.61E-05	4.56E-05	4.10E-05	4.88E-05	4.55E-05
TE-123	1E13 Y	6.19E-07	7.66E-07	3.03E-07	4.76E-06	3.16E-07	3.42E-07	7.72E-07	4.88E-07
TE-123M	119.7 D	3.49E-05	3.23E-05	3.39E-05	5.75E-05	3.12E-05	2.75E-05	3.37E-05	3.09E-05
TE-125M	58 D	1.98E-06	2.61E-06	1.12E-06	1.31E-05	1.13E-06	1.24E-06	2.38E-06	1.60E-06
TE-127	9.35 H	1.19E-06	1.11E-06	1.23E-06	1.54E-06	1.09E-06	9.75E-07	1.15E-06	1.07E-06
TE-127M	109 D	6.45E-07	8.25E-07	3.81E-07	4.17E-06	3.78E-07	4.06E-07	7.68E-07	5.24E-07
TE-129	69.6 M	1.29E-05	1.23E-05	1.34E-05	1.76E-05	1.18E-05	1.07E-05	1.27E-05	1.17E-05
TE-129M	33.6 D	7.91E-06	7.73E-06	8.28E-06	1.22E-05	7.29E-06	6.62E-06	8.02E-06	7.24E-06

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
IN-117	43.8 M	1.63E-04	1.57E-04	1.69E-04	2.04E-04	1.70E-04	1.48E-04	1.34E-04	2.08E-04
IN-117M	116.5 M	2.11E-05	2.02E-05	2.20E-05	2.92E-05	2.20E-05	1.83E-05	1.73E-05	2.98E-05
SN-113	115.1 D	2.70E-06	1.67E-06	2.19E-06	3.12E-06	1.60E-06	1.68E-06	1.45E-06	3.28E-06
SN-117M	13.60 D	3.50E-05	3.33E-05	3.69E-05	5.46E-05	3.43E-05	2.91E-05	2.80E-05	5.61E-05
SN-119M	293.0 D	9.73E-07	3.48E-07	6.02E-07	9.33E-07	2.12E-07	4.16E-07	2.95E-07	1.02E-06
SN-123	129.2 D	1.56E-06	1.47E-06	1.57E-06	1.66E-06	1.58E-06	1.42E-06	1.28E-06	1.69E-06
SN-125	9.64 D	6.92E-05	6.56E-05	6.96E-05	7.43E-05	7.05E-05	6.27E-05	5.67E-05	7.56E-05
SN-126	1.0E5 Y	1.21E-05	1.12E-05	1.25E-05	2.14E-05	8.58E-06	9.42E-06	8.05E-06	2.20E-05
SB-117	2.80 H	4.08E-05	3.87E-05	4.26E-05	6.09E-05	4.01E-05	3.43E-05	3.26E-05	6.24E-05
SB-122	2.70 D	1.05E-04	1.00E-04	1.07E-04	1.21E-04	1.10E-04	9.67E-05	8.62E-05	1.23E-04
SB-124	60.20 D	4.19E-04	3.98E-04	4.22E-04	4.53E-04	4.29E-04	3.76E-04	3.45E-04	4.61E-04
SB-125	2.77 Y	1.01E-04	9.59E-05	1.03E-04	1.20E-04	1.05E-04	9.17E-05	8.24E-05	1.22E-04
SB-126	12.4 D	6.53E-04	6.23E-04	6.67E-04	7.45E-04	6.80E-04	6.02E-04	5.37E-04	7.57E-04
SB-126M	19.0 M	3.74E-04	3.57E-04	3.82E-04	4.30E-04	3.90E-04	3.44E-04	3.07E-04	4.37E-04
SB-127	3.85 D	1.57E-04	1.50E-04	1.60E-04	1.81E-04	1.64E-04	1.44E-04	1.29E-04	1.84E-04
SB-129	4.40 H	3.31E-04	3.14E-04	3.35E-04	3.63E-04	3.40E-04	3.02E-04	2.72E-04	3.69E-04
TE-121	16.8 D	1.34E-04	1.27E-04	1.37E-04	1.56E-04	1.39E-04	1.23E-04	1.09E-04	1.58E-04
TE-121M	154 D	4.95E-05	4.68E-05	5.10E-05	6.81E-05	5.06E-05	4.18E-05	4.00E-05	6.96E-05
TE-123	1E13 Y	1.36E-06	5.30E-07	7.94E-07	1.29E-06	2.84E-07	5.59E-07	3.80E-07	1.36E-06
TE-123M	119.7 D	3.35E-05	3.19E-05	3.52E-05	5.22E-05	3.28E-05	2.78E-05	2.67E-05	5.36E-05
TE-125M	58 D	4.32E-06	1.87E-06	2.56E-06	4.25E-06	9.71E-07	1.83E-06	1.24E-06	4.43E-06
TE-127	9.35 H	1.15E-06	1.11E-06	1.19E-06	1.44E-06	1.22E-06	1.04E-06	9.54E-07	1.46E-06
TE-127M	109 D	1.36E-06	6.04E-07	8.25E-07	1.36E-06	3.26E-07	5.92E-07	4.06E-07	1.42E-06
TE-129	69.6 M	1.29E-05	1.21E-05	1.31E-05	1.53E-05	1.32E-05	1.16E-05	1.04E-05	1.56E-05
TE-129M	33.6 D	8.42E-06	7.52E-06	8.17E-06	9.34E-06	7.96E-06	7.31E-06	6.41E-06	9.53E-06

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
IN-117	43.8 M	2.59E-04	1.54E-04	1.55E-04	2.28E-04	1.74E-04	2.14E-04	1.37E-04	1.81E-04
IN-117M	116.5 M	3.54E-05	2.01E-05	2.00E-05	3.07E-05	2.27E-05	2.88E-05	1.78E-05	2.42E-05
SN-113	115.1 D	1.10E-05	1.68E-06	1.75E-06	5.47E-06	2.00E-06	3.59E-06	1.14E-06	3.87E-06
SN-117M	13.60 D	6.13E-05	3.33E-05	3.31E-05	5.32E-05	3.91E-05	5.07E-05	2.91E-05	4.13E-05
SN-119M	293.0 D	5.47E-06	3.50E-07	4.00E-07	2.31E-06	4.88E-07	1.25E-06	9.96E-08	1.55E-06
SN-123	129.2 D	2.38E-06	1.43E-06	1.45E-06	2.06E-06	1.66E-06	1.97E-06	1.29E-06	1.67E-06
SN-125	9.64 D	1.06E-04	6.34E-05	6.45E-05	9.17E-05	7.30E-05	8.69E-05	5.77E-05	7.40E-05
SN-126	1.0E5 Y	2.38E-05	1.05E-05	1.07E-05	1.99E-05	1.44E-05	1.89E-05	9.03E-06	1.49E-05
SB-117	2.80 H	7.17E-05	3.85E-05	3.83E-05	6.14E-05	4.49E-05	5.80E-05	3.37E-05	4.77E-05
SB-122	2.70 D	1.65E-04	9.76E-05	9.89E-05	1.44E-04	1.10E-04	1.34E-04	8.73E-05	1.15E-04
SB-124	60.20 D	6.36E-04	3.85E-04	3.90E-04	5.56E-04	4.36E-04	5.20E-04	3.53E-04	4.49E-04
SB-125	2.77 Y	1.63E-04	9.37E-05	9.47E-05	1.40E-04	1.06E-04	1.30E-04	8.35E-05	1.12E-04
SB-126	12.4 D	1.02E-03	6.06E-04	6.16E-04	8.89E-04	6.91E-04	8.37E-04	5.43E-04	7.12E-04
SB-126M	19.0 M	5.86E-04	3.47E-04	3.53E-04	5.10E-04	3.95E-04	4.79E-04	3.11E-04	4.08E-04
SB-127	3.85 D	2.46E-04	1.46E-04	1.48E-04	2.15E-04	1.66E-04	2.01E-04	1.31E-04	1.72E-04
SB-129	4.40 H	5.10E-04	3.05E-04	3.10E-04	4.43E-04	3.50E-04	4.19E-04	2.75E-04	3.56E-04
TE-121	16.8 D	2.17E-04	1.24E-04	1.26E-04	1.86E-04	1.40E-04	1.71E-04	1.10E-04	1.48E-04
TE-121M	154 D	8.19E-05	4.63E-05	4.62E-05	7.14E-05	5.33E-05	6.75E-05	4.10E-05	5.60E-05
TE-123	1E13 Y	5.66E-06	4.80E-07	5.49E-07	2.75E-06	7.98E-07	1.66E-06	1.88E-07	1.81E-06
TE-123M	119.7 D	5.72E-05	3.18E-05	3.16E-05	5.06E-05	3.75E-05	4.85E-05	2.78E-05	3.92E-05
TE-125M	58 D	1.51E-05	1.62E-06	1.83E-06	8.06E-06	2.89E-06	5.25E-06	8.11E-07	5.29E-06
TE-127	9.35 H	1.82E-06	1.09E-06	1.09E-06	1.61E-06	1.21E-06	1.50E-06	9.71E-07	1.28E-06
TE-127M	109 D	4.83E-06	5.29E-07	5.94E-07	2.56E-06	9.13E-07	1.67E-06	2.70E-07	1.69E-06
TE-129	69.6 M	2.14E-05	1.18E-05	1.20E-05	1.81E-05	1.34E-05	1.66E-05	1.05E-05	1.43E-05
TE-129M	33.6 D	1.51E-05	7.27E-06	7.44E-06	1.19E-05	8.53E-06	1.07E-05	6.36E-06	9.31E-06

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
TE-131	25.0 M	9.92E-05	9.43E-05	1.04E-04	1.33E-04	9.26E-05	8.32E-05	9.87E-05	9.09E-05
TE-131M	30 H	3.26E-04	3.16E-04	3.53E-04	4.08E-04	3.11E-04	2.82E-04	3.31E-04	3.05E-04
TE-132	78.2 H	5.42E-05	5.04E-05	5.26E-05	8.47E-05	4.78E-05	4.30E-05	5.15E-05	4.79E-05
TE-133	12.45 M	2.12E-04	2.04E-04	2.27E-04	2.69E-04	2.01E-04	1.82E-04	2.13E-04	1.97E-04
TE-133M	55.4 M	5.06E-04	4.92E-04	5.51E-04	6.31E-04	4.85E-04	4.41E-04	5.16E-04	4.75E-04
TE-134	41.8 M	2.09E-04	1.98E-04	2.20E-04	2.72E-04	1.94E-04	1.75E-04	2.06E-04	1.91E-04
I-122	3.62 M	2.31E-04	2.20E-04	2.45E-04	2.92E-04	2.15E-04	1.94E-04	2.28E-04	2.11E-04
I-123	13.13 H	3.89E-05	3.63E-05	3.79E-05	6.57E-05	3.47E-05	3.07E-05	3.78E-05	3.45E-05
I-124	4.18 D	2.37E-04	2.31E-04	2.57E-04	3.02E-04	2.26E-04	2.06E-04	2.41E-04	2.22E-04
I-125	60.14 D	2.27E-06	3.01E-06	1.24E-06	1.56E-05	1.25E-06	1.40E-06	2.75E-06	1.83E-06
I-126	12.93 D	1.09E-04	1.04E-04	1.16E-04	1.40E-04	1.02E-04	9.18E-05	1.09E-04	1.00E-04
I-128	24.99 M	1.82E-05	1.72E-05	1.90E-05	2.34E-05	1.67E-05	1.50E-05	1.78E-05	1.64E-05
I-129	1.57E7 Y	2.19E-06	3.03E-06	1.37E-06	1.28E-05	1.34E-06	1.52E-06	2.47E-06	1.81E-06
I-130	12.36 H	5.06E-04	4.85E-04	5.43E-04	6.28E-04	4.76E-04	4.30E-04	5.06E-04	4.66E-04
I-131	8.040 D	9.37E-05	8.76E-05	9.63E-05	1.22E-04	8.54E-05	7.68E-05	9.05E-05	8.43E-05
I-132	2.30 H	5.31E-04	5.13E-04	5.76E-04	6.55E-04	5.05E-04	4.58E-04	5.37E-04	4.94E-04
I-133	20.8 H	1.43E-04	1.37E-04	1.53E-04	1.79E-04	1.34E-04	1.21E-04	1.42E-04	1.31E-04
I-134	52.6 M	5.98E-04	5.81E-04	6.53E-04	7.36E-04	5.74E-04	5.22E-04	6.11E-04	5.62E-04
I-135	6.61 H	3.30E-04	3.29E-04	3.70E-04	4.12E-04	3.26E-04	3.00E-04	3.46E-04	3.19E-04
I-136	83 S	5.02E-04	5.07E-04	5.67E-04	6.36E-04	5.04E-04	4.69E-04	5.37E-04	4.96E-04
XE-122	20.1 H	1.47E-05	1.43E-05	1.43E-05	2.76E-05	1.29E-05	1.17E-05	1.45E-05	1.31E-05
XE-123	2.14 H	1.41E-04	1.36E-04	1.50E-04	1.92E-04	1.33E-04	1.21E-04	1.42E-04	1.31E-04
XE-125	16.8 H	6.09E-05	5.72E-05	6.01E-05	9.54E-05	5.44E-05	4.89E-05	5.88E-05	5.43E-05
XE-127	36.406 D	6.53E-05	6.07E-05	6.38E-05	1.01E-04	5.80E-05	5.19E-05	6.24E-05	5.79E-05
XE-129M	8.89 D	6.03E-06	7.18E-06	4.53E-06	2.54E-05	4.30E-06	4.36E-06	6.35E-06	5.09E-06

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
TE-131	25.0 M	9.80E-05	9.38E-05	1.01E-04	1.23E-04	1.00E-04	8.79E-05	8.03E-05	1.26E-04
TE-131M	30 H	3.31E-04	3.14E-04	3.35E-04	3.70E-04	3.39E-04	3.01E-04	2.71E-04	3.76E-04
TE-132	78.2 H	5.30E-05	4.96E-05	5.43E-05	7.46E-05	5.30E-05	4.40E-05	4.20E-05	7.63E-05
TE-133	12.45 M	2.13E-04	2.03E-04	2.17E-04	2.46E-04	2.21E-04	1.92E-04	1.76E-04	2.50E-04
TE-133M	55.4 M	5.16E-04	4.89E-04	5.22E-04	5.72E-04	5.28E-04	4.69E-04	4.22E-04	5.82E-04
TE-134	41.8 M	2.07E-04	1.97E-04	2.12E-04	2.50E-04	2.14E-04	1.87E-04	1.69E-04	2.54E-04
I-122	3.62 M	2.29E-04	2.19E-04	2.35E-04	2.68E-04	2.40E-04	2.10E-04	1.88E-04	2.73E-04
I-123	13.13 H	3.82E-05	3.57E-05	3.95E-05	5.74E-05	3.67E-05	3.15E-05	2.99E-05	5.89E-05
I-124	4.18 D	2.42E-04	2.30E-04	2.45E-04	2.70E-04	2.49E-04	2.19E-04	1.98E-04	2.75E-04
I-125	60.14 D	5.06E-06	2.14E-06	2.95E-06	4.90E-06	1.08E-06	2.10E-06	1.40E-06	5.12E-06
I-126	12.93 D	1.09E-04	1.03E-04	1.11E-04	1.26E-04	1.13E-04	9.95E-05	8.90E-05	1.29E-04
I-128	24.99 M	1.78E-05	1.70E-05	1.83E-05	2.15E-05	1.88E-05	1.62E-05	1.47E-05	2.18E-05
I-129	1.57E7 Y	4.79E-06	2.28E-06	2.88E-06	4.89E-06	1.09E-06	2.07E-06	1.37E-06	5.06E-06
I-130	12.36 H	5.05E-04	4.82E-04	5.16E-04	5.76E-04	5.26E-04	4.66E-04	4.15E-04	5.86E-04
I-131	8.040 D	9.07E-05	8.71E-05	9.38E-05	1.14E-04	9.64E-05	8.15E-05	7.51E-05	1.16E-04
I-132	2.30 H	5.36E-04	5.10E-04	5.45E-04	5.97E-04	5.54E-04	4.93E-04	4.40E-04	6.06E-04
I-133	20.8 H	1.42E-04	1.36E-04	1.46E-04	1.65E-04	1.49E-04	1.31E-04	1.17E-04	1.68E-04
I-134	52.6 M	6.09E-04	5.79E-04	6.17E-04	6.67E-04	6.25E-04	5.57E-04	5.00E-04	6.79E-04
I-135	6.61 H	3.46E-04	3.28E-04	3.48E-04	3.67E-04	3.51E-04	3.10E-04	2.84E-04	3.73E-04
I-136	83 S	5.41E-04	5.08E-04	5.35E-04	5.56E-04	5.44E-04	4.69E-04	4.43E-04	5.66E-04
XE-122	20.1 H	1.60E-05	1.37E-05	1.52E-05	2.02E-05	1.41E-05	1.26E-05	1.14E-05	2.06E-05
XE-123	2.14 H	1.43E-04	1.36E-04	1.46E-04	1.72E-04	1.45E-04	1.27E-04	1.16E-04	1.75E-04
XE-125	16.8 H	6.07E-05	5.63E-05	6.15E-05	8.21E-03	5.97E-05	5.08E-05	4.76E-05	8.39E-05
XE-127	36.406 D	6.38E-05	5.98E-05	6.54E-05	8.95E-05	6.40E-05	5.34E-05	5.08E-05	9.15E-05
XE-129M	8.89 D	1.03E-05	5.90E-06	7.14E-06	1.14E-05	4.12E-06	5.34E-06	4.11E-06	1.18E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
TE-131	25.0 M	1.55E-04	9.19E-05	9.26E-05	1.37E-04	1.06E-04	1.30E-04	8.22E-05	1.09E-04
TE-131M	30 H	5.13E-04	3.05E-04	3.10E-04	4.46E-04	3.51E-04	4.22E-04	2.75E-04	3.58E-04
TE-132	78.2 H	8.95E-05	4.90E-05	4.89E-05	7.76E-05	5.70E-05	7.28E-05	4.31E-05	6.04E-05
TE-133	12.45 M	3.29E-04	1.98E-04	2.00E-04	2.89E-04	2.25E-04	2.72E-04	1.79E-04	2.31E-04
TE-133M	55.4 M	7.96E-04	4.75E-04	4.83E-04	6.92E-04	5.47E-04	6.56E-04	4.29E-04	5.56E-04
TE-134	41.8 M	3.28E-04	1.92E-04	1.95E-04	2.86E-04	2.20E-04	2.70E-04	1.72E-04	2.28E-04
I-122	3.62 M	3.61E-04	2.13E-04	2.16E-04	3.15E-04	2.39E-04	2.92E-04	1.91E-04	2.51E-04
I-123	13.13 H	6.71E-05	3.55E-05	3.54E-05	5.76E-05	4.19E-05	5.43E-05	3.09E-05	4.45E-05
I-124	4.18 D	3.77E-04	2.23E-04	2.26E-04	3.27E-04	2.52E-04	3.04E-04	2.02E-04	2.62E-04
I-125	60.14 D	1.80E-05	1.84E-06	2.09E-06	9.49E-06	3.32E-06	6.12E-06	8.80E-07	6.21E-06
I-126	12.93 D	1.74E-04	1.01E-04	1.02E-04	1.50E-04	1.15E-04	1.40E-04	8.99E-05	1.20E-04
I-128	24.99 M	2.84E-05	1.67E-05	1.68E-05	2.48E-05	1.86E-05	2.29E-05	1.49E-05	1.97E-05
I-129	1.57E7 Y	1.43E-05	1.87E-06	2.11E-06	8.36E-06	3.61E-06	5.86E-06	1.10E-06	5.47E-06
I-130	12.36 H	7.92E-04	4.69E-04	4.76E-04	6.88E-04	5.34E-04	6.46E-04	4.20E-04	5.51E-04
I-131	8.040 D	1.44E-04	8.56E-05	8.60E-05	1.27E-04	9.58E-05	1.18E-04	7.64E-05	1.01E-04
I-132	2.30 H	8.33E-04	4.95E-04	5.04E-04	7.23E-04	5.67E-04	6.82E-04	4.45E-04	5.81E-04
I-133	20.8 H	2.24E-04	1.33E-04	1.34E-04	1.95E-04	1.49E-04	1.82E-04	1.19E-04	1.56E-04
I-134	52.6 M	9.40E-04	5.61E-04	5.71E-04	8.15E-04	6.46E-04	7.73E-04	5.06E-04	6.56E-04
I-135	6.61 H	5.23E-04	3.17E-04	3.21E-04	4.56E-04	3.63E-04	4.30E-04	2.91E-04	3.69E-04
I-136	83 S	7.91E-04	4.89E-04	4.99E-04	6.99E-04	5.55E-04	6.50E-04	4.53E-04	5.66E-04
XE-122	20.1 H	3.12E-05	1.33E-05	1.35E-05	2.40E-05	1.59E-05	2.10E-05	1.14E-05	1.82E-05
XE-123	2.14 H	2.28E-04	1.32E-04	1.33E-04	1.98E-04	1.51E-04	1.85E-04	1.19E-04	1.57E-04
XE-125	16.8 H	1.04E-04	5.54E-05	5.55E-05	8.83E-05	6.45E-05	8.22E-05	4.87E-05	6.87E-05
XE-127	36.406 D	1.08E-04	5.92E-05	5.91E-05	9.34E-05	6.85E-05	8.75E-05	5.21E-05	7.27E-05
XE-129M	8.89 D	2.81E-05	5.23E-06	5.61E-06	1.74E-05	8.40E-06	1.29E-05	3.65E-06	1.18E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
XE-131M	11.84 D	2.23E-06	2.66E-06	1.63E-06	1.00E-05	1.56E-06	1.58E-06	2.37E-06	1.87E-06
XE-133	5.245 D	8.26E-06	9.04E-06	8.06E-06	2.20E-05	7.34E-06	6.69E-06	8.52E-06	7.34E-06
XE-133M	2.19 D	7.53E-06	7.52E-06	6.81E-06	1.76E-05	6.25E-06	5.80E-06	7.36E-06	6.57E-06
XE-135	9.11 H	6.21E-05	5.70E-05	6.15E-05	8.58E-05	5.55E-05	4.97E-05	5.88E-05	5.52E-05
XE-135M	15.36 M	1.03E-04	9.77E-05	1.09E-04	1.31E-04	9.52E-05	8.57E-05	1.01E-04	9.34E-05
XE-137	3.83 M	4.37E-05	4.18E-05	4.65E-05	5.55E-05	4.09E-05	3.71E-05	4.35E-05	4.02E-05
XE-138	14.13 M	2.37E-04	2.38E-04	2.65E-04	3.06E-04	2.36E-04	2.18E-04	2.51E-04	2.32E-04
CS-126	1.64 M	2.68E-04	2.55E-04	2.84E-04	3.41E-04	2.49E-04	2.25E-04	2.65E-04	2.45E-04
CS-129	32.06 H	6.43E-05	6.14E-05	6.51E-05	9.70E-05	5.78E-05	5.24E-05	6.27E-05	5.77E-05
CS-131	9.688 D	1.92E-06	2.60E-06	1.12E-06	1.19E-05	1.12E-06	1.27E-06	2.16E-06	1.56E-06
CS-132	6.475 D	1.67E-04	1.60E-04	1.78E-04	2.15E-04	1.56E-04	1.41E-04	1.67E-04	1.53E-04
CS-134	2.062 Y	3.67E-04	3.53E-04	3.95E-04	4.53E-04	3.47E-04	3.13E-04	3.69E-04	3.39E-04
CS-134M	2.90 H	5.06E-06	5.14E-06	4.67E-06	1.23E-05	4.34E-06	3.92E-06	5.09E-06	4.45E-06
CS-135	2.3E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-136	13.16 D	4.95E-04	4.80E-04	5.37E-04	6.19E-04	4.72E-04	4.29E-04	5.03E-04	4.63E-04
CS-137	30.17 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-138	32.2 M	4.88E-04	4.88E-04	5.47E-04	6.15E-04	4.84E-04	4.47E-04	5.15E-04	4.75E-04
CS-139	9.40 M	6.17E-05	6.23E-05	6.99E-05	7.78E-05	6.19E-05	5.74E-05	5.58E-05	6.08E-05
BA-131	11.8 D	1.10E-04	1.05E-04	1.13E-04	1.59E-04	1.01E-04	9.06E-05	1.08E-04	9.95E-05
BA-133	10.5 Y	9.09E-05	8.67E-05	9.11E-05	1.41E-04	8.14E-05	7.35E-05	8.80E-05	8.11E-05
BA-133M	38.9 H	1.41E-05	1.36E-05	1.35E-05	2.60E-05	1.22E-05	1.12E-05	1.37E-05	1.25E-05
BA-135M	28.7 H	1.25E-05	1.23E-05	1.18E-05	2.37E-05	1.07E-05	9.86E-06	1.21E-05	1.10E-05
BA-137M	2.552 M	1.42E-04	1.36E-04	1.52E-04	1.76E-04	1.34E-04	1.21E-04	1.42E-04	1.31E-04
BA-139	83.1 M	8.52E-06	7.94E-06	8.47E-06	1.30E-05	7.73E-06	6.87E-06	8.27E-06	7.64E-06
BA-140	12.789 D	4.53E-05	4.30E-05	4.73E-05	6.05E-05	4.17E-05	3.75E-05	4.45E-05	4.10E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
XE-131M	11,84 D	3.91E-06	2.16E-06	2.66E-06	4.30E-06	1.46E-06	1.97E-06	1.50E-06	4.45E-06
XE-133	5.245 D	1.04E-05	8.51E-06	9.61E-06	1.65E-05	6.00E-06	7.18E-06	5.85E-06	1.70E-05
XE-133M	2.19 D	8.96E-06	6.99E-06	7.90E-06	1.12E-05	6.79E-06	6.28E-06	5.65E-06	1.15E-05
XE-135	9.11 H	5.89E-05	5.67E-05	6.14E-05	8.03E-05	6.27E-05	5.11E-05	4.88E-05	8.19E-05
XE-135M	15.36 M	1.02E-04	9.70E-05	1.04E-04	1.20E-04	1.06E-04	9.33E-05	8.34E-05	1.22E-04
XE-137	3.83 M	4.35E-05	4.16E-05	4.45E-05	5.10E-05	4.56E-05	3.94E-05	3.59E-05	5.18E-05
XE-138	14.13 M	2.52E-04	2.38E-04	2.52E-04	2.72E-04	2.56E-04	2.19E-04	2.07E-04	2.77E-04
CS-126	1.64 M	2.65E-04	2.54E-04	2.72E-04	3.14E-04	2.78E-04	2.43E-04	2.19E-04	3.19E-04
CS-129	32.06 H	6.58E-05	6.01E-05	6.53E-05	8.05E-05	6.48E-05	5.64E-05	5.11E-05	8.20E-05
CS-131	9.688 D	4.28E-06	1.93E-06	2.51E-06	4.22E-06	9.26E-07	1.80E-06	1.19E-06	4.38E-06
CS-132	6.475 D	1.69E-04	1.59E-04	1.70E-04	1.91E-04	1.72E-04	1.54E-04	1.36E-04	1.94E-04
CS-134	2.062 Y	3.68E-04	3.50E-04	3.75E-04	4.14E-04	3.82E-04	3.40E-04	3.02E-04	4.21E-04
CS-134M	2.90 H	5.96E-06	4.81E-06	5.46E-06	8.70E-06	4.19E-06	4.19E-06	3.71E-06	8.96E-06
CS-135	2.3E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-136	13.16 D	5.02E-04	4.77E-04	5.09E-04	5.62E-04	5.14E-04	4.58E-04	4.11E-04	5.72E-04
CS-137	30.17 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-138	32.2 M	5.16E-04	4.88E-04	5.16E-04	5.46E-04	5.23E-04	4.57E-04	4.24E-04	5.55E-04
CS-139	9.40 M	6.61E-05	6.24E-05	6.58E-05	6.86E-05	6.66E-05	5.80E-05	5.42E-05	6.97E-05
BA-131	11.8 D	1.11E-04	1.04E-04	1.12E-04	1.39E-04	1.11E-04	9.71E-05	8.80E-05	1.42E-04
BA-133	10.5 Y	9.23E-05	8.50E-05	9.26E-05	1.20E-04	8.97E-05	7.80E-05	7.13E-05	1.23E-04
BA-133M	38.9 H	1.54E-05	1.32E-05	1.45E-05	1.97E-05	1.35E-05	1.19E-05	1.09E-05	2.01E-05
BA-135M	28.7 H	1.39E-05	1.17E-05	1.29E-05	1.76E-05	1.18E-05	1.05E-05	9.55E-06	1.80E-05
BA-137M	2.552 M	1.42E-04	1.35E-04	1.45E-04	1.61E-04	1.47E-04	1.31E-04	1.16E-04	1.64E-04
BA-139	83.1 M	8.20E-06	7.89E-06	8.61E-06	1.21E-05	8.22E-06	6.94E-06	6.65E-06	1.24E-05
BA-140	12.789 D	4.49E-05	4.26E-05	4.59E-05	5.44E-05	4.64E-05	4.05E-05	3.65E-05	5.53E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
XE-131M	11.84 D	1.11E-05	1.92E-06	2.07E-06	6.73E-06	3.11E-06	4.92E-06	1.29E-06	4.54E-06
XE-133	5.245 D	2.15E-05	7.79E-06	8.04E-06	1.70E-05	1.14E-05	1.54E-05	6.48E-06	1.23E-05
XE-133M	2.19 D	1.93E-05	6.70E-06	6.83E-06	1.40E-05	8.54E-06	1.18E-05	5.54E-06	1.02E-05
XE-135	9.11 H	9.36E-05	5.62E-05	5.60E-05	8.39E-05	6.35E-05	7.95E-05	5.01E-05	6.63E-05
XE-135M	15.36 M	1.62E-04	9.46E-05	9.57E-05	1.40E-04	1.06E-04	1.30E-04	8.45E-05	1.12E-04
XE-137	3.83 M	6.78E-05	4.06E-05	4.10E-05	5.95E-05	4.54E-05	5.53E-05	3.66E-05	4.76E-05
XE-138	14.13 M	3.74E-04	2.30E-04	2.33E-04	3.30E-04	2.58E-04	3.07E-04	2.14E-04	2.67E-04
CS-126	1.64 M	4.19E-04	2.48E-04	2.50E-04	3.66E-04	2.77E-04	3.39E-04	2.22E-04	2.92E-04
CS-129	32.06 H	1.14E-04	5.86E-05	5.92E-05	9.42E-05	6.72E-05	8.50E-05	5.16E-05	7.33E-05
CS-131	9.688 D	1.34E-05	1.60E-06	1.81E-06	7.63E-06	3.05E-06	5.19E-06	8.57E-07	4.97E-06
CS-132	6.475 D	2.71E-04	1.54E-04	1.57E-04	2.31E-04	1.77E-04	2.16E-04	1.37E-04	1.84E-04
CS-134	2.062 Y	5.75E-04	3.41E-04	3.46E-04	4.99E-04	3.89E-04	4.70E-04	3.05E-04	4.00E-04
CS-134M	2.90 H	1.26E-05	4.61E-06	4.68E-06	9.52E-06	6.15E-06	8.41E-06	3.81E-06	6.97E-06
CS-135	2.3E6 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-136	13.16 D	7.79E-04	4.63E-04	4.70E-04	6.77E-04	5.36E-04	6.44E-04	4.17E-04	5.43E-04
CS-137	30.17 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CS-138	32.2 M	7.71E-04	4.71E-04	4.78E-04	6.77E-04	5.35E-04	6.33E-04	4.34E-04	5.47E-04
CS-139	9.40 M	9.78E-05	6.01E-05	6.10E-05	8.59E-05	6.82E-05	8.03E-05	5.57E-05	6.96E-05
BA-131	11.8 D	1.84E-04	1.01E-04	1.02E-04	1.58E-04	1.16E-04	1.45E-04	8.96E-05	1.24E-04
BA-133	10.5 Y	1.57E-04	8.29E-05	8.34E-05	1.34E-04	9.67E-05	1.22E-04	7.30E-05	1.04E-04
BA-133M	38.9 H	2.87E-05	1.27E-05	1.29E-05	2.28E-05	1.55E-05	2.02E-05	1.10E-05	1.72E-05
BA-135M	28.7 H	2.60E-05	1.12E-05	1.14E-05	2.06E-05	1.39E-05	1.82E-05	9.64E-06	1.54E-05
BA-137M	2.552 M	2.23E-04	1.32E-04	1.34E-04	1.93E-04	1.50E-04	1.82E-04	1.18E-04	1.55E-04
BA-139	83.1 M	1.32E-05	7.82E-06	7.78E-06	1.20E-05	9.16E-06	1.16E-05	6.94E-06	9.40E-06
BA-140	12.789 D	7.29E-05	4.16E-05	4.20E-05	6.28E-05	4.70E-05	5.81E-05	3.71E-05	4.97E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
BA-141	18.27 M	2.05E-04	1.97E-04	2.18E-04	2.67E-04	1.93E-04	1.75E-04	2.05E-04	1.90E-04
BA-142	10.70 M	2.02E-04	1.97E-04	2.20E-04	2.57E-04	1.94E-04	1.76E-04	2.06E-04	1.90E-04
LA-140	40.22 H	4.85E-04	4.83E-04	5.42E-04	6.11E-04	4.78E-04	4.40E-04	5.08E-04	4.69E-04
LA-141	3.94 H	8.61E-06	8.64E-06	9.73E-06	1.07E-05	8.55E-06	7.92E-06	9.11E-06	8.40E-06
LA-142	95.4 M	5.49E-04	5.57E-04	6.20E-04	7.01E-04	5.55E-04	5.15E-04	5.90E-04	5.45E-04
CE-139	137.66 D	3.65E-05	3.48E-05	3.50E-05	6.43E-05	3.22E-05	2.88E-05	3.54E-05	3.23E-05
CE-141	32.50 D	1.86E-05	1.75E-05	1.82E-05	3.10E-05	1.67E-05	1.47E-05	1.81E-05	1.65E-05
CE-143	33.0 H	6.33E-05	6.08E-05	6.46E-05	9.13E-05	5.75E-05	5.21E-05	6.19E-05	5.70E-05
CE-144	284.3 D	4.30E-06	4.21E-06	4.20E-06	8.05E-06	3.87E-06	3.43E-06	4.27E-06	3.82E-06
PR-142	19.13 H	1.16E-05	1.17E-05	1.32E-05	1.46E-05	1.16E-05	1.08E-05	1.24E-05	1.14E-05
PR-143	13.56 D	2.11E-12	2.03E-12	2.28E-12	2.59E-12	2.00E-12	1.80E-12	2.12E-12	1.95E-12
PR-144	17.28 M	6.74E-06	6.77E-06	7.57E-06	8.52E-06	6.72E-06	6.20E-06	7.15E-06	6.60E-06
PR-144M	7.2 M	1.15E-06	1.71E-06	8.78E-07	5.16E-06	8.23E-07	9.28E-07	1.31E-06	9.83E-07
ND-147	10.98 D	3.15E-05	3.12E-05	3.25E-05	4.95E-05	2.88E-05	2.61E-05	3.14E-05	2.84E-05
ND-149	1.73 H	9.22E-05	8.70E-05	9.38E-05	1.29E-04	8.39E-05	7.53E-05	8.96E-05	8.29E-05
PM-143	265 D	7.05E-05	6.94E-05	7.52E-05	9.57E-05	6.60E-05	6.01E-05	7.13E-05	6.50E-05
PM-144	363 D	3.67E-04	3.53E-04	3.92E-04	4.64E-04	3.44E-04	3.10E-04	3.66E-04	3.37E-04
PM-145	17.7 Y	3.56E-06	5.09E-06	2.95E-06	1.42E-05	2.72E-06	2.95E-06	4.00E-06	3.09E-06
PM-146	2020 D	1.78E-04	1.70E-04	1.89E-04	2.27E-04	1.66E-04	1.50E-04	1.77E-04	1.63E-04
PM-147	2.6234 Y	8.62E-10	8.07E-10	8.59E-10	1.44E-09	7.92E-10	6.85E-10	8.51E-10	7.70E-10
PM-148	5.37 D	1.23E-04	1.21E-04	1.36E-04	1.53E-04	1.20E-04	1.10E-04	1.27E-04	1.17E-04
PM-148M	41.3 D	4.73E-04	4.52E-04	5.05E-04	5.89E-04	4.44E-04	4.00E-04	4.71E-04	4.34E-04
PM-149	53.08 H	2.87E-06	2.67E-06	2.91E-06	3.84E-06	2.60E-06	2.34E-06	2.76E-06	2.58E-06
PM-151	28.40 H	8.11E-05	7.68E-05	8.32E-05	1.12E-04	7.41E-05	6.67E-05	7.91E-05	7.31E-05
SM-147	1.069E11 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
BA-141	18.27 M	2.05E-04	1.96E-04	2.10E-04	2.45E-04	2.13E-04	1.83E-04	1.69E-04	2.49E-04
BA-142	10.70 M	2.06E-04	1.96E-04	2.09E-04	2.32E-04	2.10E-04	1.87E-04	1.69E-04	2.36E-04
LA-140	40.22 H	5.09E-04	4.83E-04	5.11E-04	5.45E-04	5.18E-04	4.53E-04	4.18E-04	5.54E-04
LA-141	3.94 H	9.10E-06	8.63E-06	9.12E-06	9.53E-06	9.20E-06	8.14E-06	7.48E-06	9.69E-06
LA-142	95.4 M	5.96E-04	5.59E-04	5.87E-04	6.12E-04	5.99E-04	5.11E-04	4.87E-04	6.22E-04
CE-139	137.66 D	3.72E-05	3.38E-05	3.73E-05	5.54E-05	3.38E-05	2.94E-05	2.77E-05	5.68E-05
CE-141	32.50 D	1.81E-05	1.72E-05	1.90E-05	2.89E-05	1.71E-05	1.49E-05	1.41E-05	2.97E-05
CE-143	33.0 H	6.42E-05	5.97E-05	6.45E-05	8.05E-05	6.34E-05	5.54E-05	5.03E-05	8.20E-05
CE-144	284.3 D	4.46E-06	4.09E-06	4.53E-06	7.17E-06	3.75E-06	3.51E-06	3.22E-06	7.36E-06
PR-142	19.13 H	1.24E-05	1.17E-05	1.24E-05	1.28E-05	1.25E-05	1.09E-05	1.02E-05	1.31E-05
PR-143	13.56 D	2.12E-12	2.02E-12	2.15E-12	2.36E-12	2.19E-12	1.96E-12	1.74E-12	2.40E-12
PR-144	17.28 M	7.18E-06	6.78E-06	7.16E-06	7.55E-06	7.27E-06	6.30E-06	5.88E-06	7.67E-06
PR-144M	7.2 M	2.34E-06	1.34E-06	1.52E-06	2.68E-06	6.14E-07	1.11E-06	7.33E-07	2.74E-06
ND-147	10.98 D	3.30E-05	3.04E-05	3.30E-05	4.35E-05	3.02E-05	2.81E-05	2.47E-05	4.43E-05
ND-149	1.73 H	9.04E-05	8.61E-05	9.32E-05	1.19E-04	9.23E-05	7.91E-05	7.31E-05	1.22E-04
PM-143	265 D	7.38E-05	6.80E-05	7.29E-05	8.28E-05	7.17E-05	6.56E-05	5.75E-05	8.42E-05
PM-144	363 D	3.68E-04	3.49E-04	3.74E-04	4.22E-04	3.79E-04	3.38E-04	3.00E-04	4.29E-04
PM-145	17.7 Y	6.65E-06	4.14E-06	4.65E-06	8.23E-06	2.02E-06	3.39E-06	2.32E-06	8.41E-06
PM-146	2020 D	1.78E-04	1.69E-04	1.81E-04	2.06E-04	1.83E-04	1.62E-04	1.45E-04	2.09E-04
PM-147	2.6234 Y	8.18E-10	8.05E-10	8.91E-10	1.41E-09	7.70E-10	6.93E-10	6.52E-10	1.45E-09
PM-148	5.37 D	1.27E-04	1.21E-04	1.28E-04	1.38E-04	1.30E-04	1.15E-04	1.05E-04	1.40E-04
PM-148M	41.3 D	4.71E-04	4.49E-04	4.81E-04	5.41E-04	4.90E-04	4.33E-04	3.87E-04	5.50E-04
PM-149	53.08 H	2.77E-06	2.66E-06	2.87E-06	3.58E-06	2.94E-06	2.45E-06	2.29E-06	3.64E-06
PM-151	28.40 H	8.00E-05	7.60E-05	8.21E-05	1.03E-04	8.17E-05	7.05E-05	6.46E-05	1.05E-04
SM-147	1.069E11 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
BA-141	18.27 M	3.18E-04	1.91E-04	1.93E-04	2.81E-04	2.18E-04	2.65E-04	1.73E-04	2.24E-04
BA-142	10.70 M	3.20E-04	1.90E-04	1.93E-04	2.78E-04	2.20E-04	2.64E-04	1.72E-04	2.23E-04
LA-140	40.22 H	7.67E-04	4.66E-04	4.72E-04	6.71E-04	5.29E-04	6.29E-04	4.29E-04	5.42E-04
LA-141	3.94 H	1.37E-05	8.33E-06	8.41E-06	1.19E-05	9.54E-06	1.13E-05	7.69E-06	9.66E-06
LA-142	95.4 M	8.64E-04	5.37E-04	5.50E-04	7.66E-04	6.03E-04	7.06E-04	4.99E-04	6.21E-04
CE-139	137.66 D	6.45E-05	3.37E-05	3.32E-05	5.58E-05	4.06E-05	5.26E-05	2.89E-05	4.26E-05
CE-141	32.50 D	3.00E-05	1.70E-05	1.70E-05	2.73E-05	2.06E-05	2.65E-05	1.49E-05	2.11E-05
CE-143	33.0 H	1.05E-04	5.80E-05	5.86E-05	9.06E-05	6.79E-05	8.43E-05	5.15E-05	7.10E-05
CE-144	284.3 D	7.74E-06	3.98E-06	3.99E-06	6.84E-06	5.08E-06	6.57E-06	3.45E-06	5.19E-06
PR-142	19.13 H	1.84E-05	1.13E-05	1.14E-05	1.61E-05	1.28E-05	1.51E-05	1.05E-05	1.31E-05
PR-143	13.56 D	3.31E-12	1.96E-12	1.99E-12	2.86E-12	2.25E-12	2.71E-12	1.75E-12	2.30E-12
PR-144	17.28 M	1.07E-05	6.52E-06	6.65E-06	9.36E-06	7.36E-06	8.70E-06	6.04E-06	7.58E-06
PR-144M	7.2 M	5.43E-06	1.05E-06	1.16E-06	3.68E-06	2.14E-06	2.94E-06	7.94E-07	2.44E-06
ND-147	10.98 D	5.51E-05	2.92E-05	2.96E-05	4.76E-05	3.55E-05	4.43E-05	2.58E-05	3.68E-05
ND-149	1.73 H	1.45E-04	8.44E-05	8.48E-05	1.28E-04	9.74E-05	1.21E-04	7.51E-05	1.01E-04
PM-143	265 D	1.19E-04	6.53E-05	6.68E-05	1.01E-04	7.76E-05	9.43E-05	5.82E-05	7.98E-05
PM-144	363 D	5.82E-04	3.39E-04	3.45E-04	5.04E-04	3.88E-04	4.71E-04	3.03E-04	4.02E-04
PM-145	17.7 Y	1.45E-05	3.31E-06	3.62E-06	1.04E-05	6.46E-06	8.65E-06	2.63E-06	7.02E-06
PM-146	2020 D	2.82E-04	1.64E-04	1.67E-04	2.44E-04	1.88E-04	2.29E-04	1.47E-04	1.95E-04
PM-147	2.6234 Y	1.34E-09	8.00E-10	7.95E-10	1.26E-09	9.71E-10	1.25E-09	7.00E-10	9.77E-10
PM-148	5.37 D	1.94E-04	1.17E-04	1.19E-04	1.69E-04	1.34E-04	1.60E-04	1.07E-04	1.37E-04
PM-148M	41.3 D	7.39E-04	4.37E-04	4.44E-04	6.43E-04	4.97E-04	6.03E-04	3.92E-04	5.14E-04
PM-149	53.08 H	4.38E-06	2.62E-06	2.62E-06	3.89E-06	2.95E-06	3.66E-06	2.34E-06	3.08E-06
PM-151	28.40 H	1.28E-04	7.43E-05	7.48E-05	1.13E-04	8.57E-05	1.06E-04	6.62E-05	8.90E-05
SM-147	1.069E11 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
SM-151	90 Y	3.14E-10	1.65E-10	9.36E-11	5.06E-09	1.10E-10	8.34E-11	2.72E-10	2.21E-10
SM-153	46.7 H	1.21E-05	1.34E-05	1.17E-05	2.88E-05	1.07E-05	9.91E-06	1.25E-05	1.08E-05
EU-152	13.6 Y	2.53E-04	2.48E-04	2.75E-04	3.29E-04	2.42E-04	2.21E-04	2.59E-04	2.38E-04
EU-152M	9.32 H	7.15E-05	7.01E-05	7.75E-05	9.27E-05	6.82E-05	6.20E-05	7.30E-05	6.69E-05
EU-154	8.8 Y	2.77E-04	2.71E-04	3.03E-04	3.50E-04	2.67E-04	2.43E-04	2.84E-04	2.61E-04
EU-155	4.96 Y	1.33E-05	1.37E-05	1.34E-05	2.74E-05	1.22E-05	1.09E-05	1.35E-05	1.19E-05
EU-156	15.19 D	2.84E-04	2.85E-04	3.19E-04	3.59E-04	2.82E-04	2.60E-04	3.00E-04	2.76E-04
GD-152	1.1E14 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GD-153	241.6 D	2.10E-05	2.37E-05	2.02E-05	5.24E-05	1.85E-05	1.72E-05	2.19E-05	1.87E-05
GD-159	18.56 H	9.24E-06	9.05E-06	9.34E-06	1.44E-05	8.31E-06	7.58E-06	9.00E-06	8.27E-06
GD-162	9.7 M	1.03E-04	9.70E-05	1.07E-04	1.33E-04	9.45E-05	8.49E-05	1.00E-04	9.30E-05
TB-157	150 Y	6.04E-07	8.26E-07	5.45E-07	2.27E-06	4.93E-07	5.15E-07	6.57E-07	5.30E-07
TB-160	72.3 D	2.43E-04	2.37E-04	2.65E-04	3.07E-04	2.33E-04	2.12E-04	2.48E-04	2.29E-04
TB-162	7.76 M	2.59E-04	2.48E-04	2.76E-04	3.30E-04	2.44E-04	2.20E-04	2.59E-04	2.39E-04
DY-157	8.06 H	8.39E-05	7.99E-05	8.43E-05	1.23E-04	7.53E-05	6.82E-05	8.08E-05	7.49E-05
DY-165	2.334 H	5.80E-06	5.75E-06	6.04E-06	9.09E-06	5.35E-06	4.85E-06	5.79E-06	5.27E-06
DY-166	81.6 H	7.32E-06	8.31E-06	7.37E-06	1.82E-05	6.60E-06	6.17E-06	7.51E-06	6.55E-06
HO-166	26.80 H	5.75E-06	6.00E-06	6.30E-06	9.65E-06	5.57E-06	5.14E-06	6.02E-06	5.46E-06
HO-166M	1.20E3 Y	3.80E-04	3.63E-04	4.03E-04	4.87E-04	3.56E-04	3.21E-04	3.78E-04	3.49E-04
ER-169	9.40 D	4.50E-10	3.69E-10	3.95E-10	5.37E-09	3.67E-10	3.10E-10	3.88E-10	3.73E-10
ER-171	7.52 H	9.11E-05	8.55E-05	9.18E-05	1.31E-04	8.23E-05	7.38E-05	8.76E-05	8.14E-05
TM-170	128.6 D	1.07E-06	1.17E-06	1.11E-06	2.54E-06	9.96E-07	9.01E-07	1.09E-06	9.64E-07
TM-171	1.92 Y	1.22E-07	1.44E-07	1.26E-07	3.36E-07	1.12E-07	1.05E-07	1.25E-07	1.10E-07
YB-169	31.97 D	6.92E-05	6.97E-05	6.90E-05	1.32E-04	6.24E-05	5.64E-05	6.77E-05	6.16E-05
YB-175	4.19 D	9.63E-06	9.06E-06	9.82E-06	1.34E-05	8.75E-06	7.85E-06	9.30E-06	8.63E-06

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
SM-151	90 Y	4.17E-10	1.41E-10	3.68E-10	5.29E-10	1.26E-10	2.40E-10	1.92E-10	6.12E-10
SM-153	46.7 H	1.48E-05	1.25F-05	1.39E-05	2.35E-05	9.21E-06	1.05E-05	8.68E-06	2.41E-05
EU-152	13.6 Y	2.61E-04	2.46E-04	2.63E-04	2.94E-04	2.62E-04	2.33E-04	2.11F-04	2.99E-04
EU-152M	9.32 H	7.38E-05	6.93E-05	7.40E-05	8.26E-05	7.35E-05	6.65E-05	5.91E-05	8.40E-05
EU-154	8.8 Y	2.84E-04	2.69E-04	2.87E-04	3.16E-04	2.88E-04	2.57E-04	2.32E-04	3.22E-04
EU-155	4.96 Y	1.44E-05	1.33E-05	1.48E-05	2.50E-05	1.05E-05	1.12E-05	9.69E-06	2.57E-05
EU-156	15.19 D	3.01E-04	2.84E-04	3.01E-04	3.19E-04	3.04E-04	2.67E-04	2.46E-04	3.24E-04
GD-152	1.1E14 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GD-153	241.6 D	2.66E-05	2.19E-05	2.43E-05	4.17E-05	1.55E-05	1.83E-05	1.49E-05	4.28E-05
GD-159	18.56 H	9.59E-06	8.84E-06	9.58E-06	1.26E-05	8.99E-06	8.06E-06	7.22E-06	1.29E-05
GD-162	9.7 M	1.01E-04	9.64E-05	1.04E-04	1.23E-04	1.07E-04	9.11E-05	8.30E-05	1.25E-04
TB-157	150 Y	1.01E-06	7.11E-07	7.91E-07	1.42E-06	3.49E-07	5.74E-07	3.97E-07	1.45E-06
TB-160	72.3 D	2.48E-04	2.36E-04	2.51E-04	2.78E-04	2.53E-04	2.25E-04	2.03E-04	2.83E-04
TB-162	7.76 M	2.59E-04	2.47E-04	2.64E-04	3.03E-04	2.67E-04	2.35E-04	2.12E-04	3.08E-04
DY-157	8.06 H	8.37E-05	7.87E-05	8.51E-05	1.11E-04	8.35E-05	7.17E-05	6.60E-05	1.13E-04
DY-165	2.334 H	6.07E-06	5.65E-06	6.12E-06	8.09E-06	5.53E-06	5.20E-06	4.56E-06	8.26E-06
DY-166	81.6 H	9.17E-06	7.90E-06	8.74E-06	1.49E-05	5.33E-06	6.58E-06	5.19E-06	1.53E-05
HO-166	26.80 H	6.38E-06	5.92E-06	6.38E-06	8.39E-06	5.42E-06	5.32E-06	4.67E-06	8.57E-06
HO-166M	1.20E3 Y	3.78E-04	3.61E-04	3.87E-04	4.47E-04	3.90E-04	3.44E-04	3.09E-04	4.55E-04
ER-169	9.40 D	3.75E-10	3.68E-10	4.55E-10	6.89E-10	3.54E-10	3.39E-10	3.28E-10	7.57E-10
ER-171	7.52 H	8.87E-05	8.49E-05	9.21E-05	1.22E-04	9.03E-05	7.70E-05	7.16E-05	1.24E-04
TM-170	128.6 D	1.24E-06	1.14E-06	1.27E-06	2.22E-06	7.78E-07	9.40E-07	7.62E-07	2.28E-06
TM-171	1.92 Y	1.58E-07	1.38E-07	1.54E-07	2.77E-07	7.95E-08	1.12E-07	8.40E-08	2.84E-07
YB-169	31.97 D	7.37E-05	6.83E-05	7.52E-05	1.18E-04	5.95E-05	5.84E-05	5.15E-05	1.21E-04
YB-175	4.19 D	9.38E-06	9.00E-06	9.73E-06	1.25E-05	9.66E-06	8.28E-06	7.62E-06	1.27E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
SM-151	90 Y	7.77E-09	1.92E-10	2.18E-10	1.77E-09	1.54E-10	7.14E-10	1.99E-11	1.33E-09
SM-153	46.7 H	2.75E-05	1.14E-05	1.17E-05	2.33E-05	1.68E-05	2.18E-05	9.73E-06	1.70E-05
EU-152	13.6 Y	4.06E-04	2.38E-04	2.41E-04	3.53E-04	2.77E-04	3.34E-04	2.15E-04	2.82E-04
EU-152M	9.32 H	1.16E-04	6.69E-05	6.82E-05	9.99E-05	7.88E-05	9.48E-05	6.00E-05	7.97E-05
EU-154	8.8 Y	4.39E-04	2.61E-04	2.65E-04	3.82E-04	3.03E-04	3.63E-04	2.36E-04	3.07E-04
EU-155	4.96 Y	2.54E-05	1.26E-05	1.28E-05	2.28E-05	1.72E-05	2.22E-05	1.09E-05	1.71E-05
EU-156	15.19 D	4.52E-04	2.74E-04	2.79E-04	3.95E-04	3.13E-04	3.71E-04	2.52E-04	3.19E-04
GD-152	1.1E14 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GD-153	241.6 D	5.02E-05	1.98E-05	2.04E-05	4.19E-05	2.99E-05	3.89E-05	1.68E-05	3.03E-05
GD-159	18.56 H	1.61E-05	8.48E-06	8.58E-06	1.38E-05	1.02E-05	1.28E-05	7.50E-06	1.07E-05
GD-162	9.7 M	1.59E-04	9.45E-05	9.51E-05	1.40E-04	1.05E-04	1.30E-04	8.45E-05	1.11E-04
TB-157	150 Y	2.42E-06	5.75E-07	6.22E-07	1.62E-06	1.08E-06	1.41E-06	4.72E-07	1.12E-06
TB-160	72.3 D	3.85E-04	2.28E-04	2.32E-04	3.34E-04	2.65E-04	3.18E-04	2.06E-04	2.68E-04
TB-162	7.76 M	4.05E-04	2.40E-04	2.44E-04	3.53E-04	2.78E-04	3.36E-04	2.15E-04	2.83E-04
DY-157	8.06 H	1.37E-04	7.66E-05	7.70E-05	1.20E-04	8.93E-05	1.12E-04	6.80E-05	9.36E-05
DY-165	2.334 H	1.01E-05	5.40E-06	5.49E-06	8.78E-06	6.64E-06	8.27E-06	4.76E-06	6.81E-06
DY-166	81.6 H	1.78E-05	7.01E-06	7.29E-06	1.47E-05	1.07E-05	1.38E-05	5.97E-06	1.07E-05
HO-166	26.80 H	1.07E-05	5.57E-06	5.67E-06	9.15E-06	7.07E-06	8.6[illegible]E-06	5.01E-06	7.11E-06
HO-166M	1.20E3 Y	5.95E-04	3.51E-04	3.56E-04	5.19E-04	4.05E-04	4.92E-04	3.14E-04	4.15E-04
ER-169	9.40 D	1.06E-08	3.77E-10	3.74E-10	1.02E-09	4.49E-10	6.10E-10	3.16E-10	1.05E-09
ER-171	7.52 H	1.44E-04	8.33E-05	8.34E-05	1.28E-04	9.63E-05	1.21E-04	7.39E-05	1.00E-04
TM-170	128.6 D	2.44E-06	1.04E-06	1.06E-06	2.02E-06	1.52E-06	1.96E-06	8.87E-07	1.50E-06
TM-171	1.92 Y	3.23E-07	1.19E-07	1.25E-07	2.63E-07	1.91E-07	2.48E-07	9.99E-08	1.90E-07
YB-169	31.97 D	1.30E-04	6.45E-05	6.54E-05	1.14E-04	8.50E-05	1.09E-04	5.59E-05	8.63E-05
YB-175	4.19 D	1.51E-05	8.81E-06	8.85E-06	1.34E-05	1.01E-05	1.25E-05	7.84E-06	1.05E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
LU-177	6.71 D	8.56E-06	8.02E-06	8.43E-06	1.36E-05	7.68E-06	6.84E-06	8.20E-06	7.60E-06
LU-177M	160.10 D	2.42E-04	2.27E-04	2.43E-04	3.56E-04	2.19E-04	1.96E-04	2.33E-04	2.16E-04
HF-181	42.39 D	1.31E-04	1.24E-04	1.37E-04	1.77E-04	1.21E-04	1.08E-04	1.28E-04	1.19E-04
TA-182	114.74 D	2.77E-04	2.74E-04	3.06E-04	3.60E-04	2.69E-04	2.47E-04	2.87E-04	2.64E-04
W-181	120.95 D	7.45E-06	8.58E-06	7.81E-06	1.94E-05	6.92E-06	6.42E-06	7.61E-06	6.71E-06
W-185	75.1 D	6.60E-09	6.15E-09	6.56E-09	1.09E-08	6.05E-09	5.23E-09	6.49E-09	5.89E-09
W-187	23.83 H	1.13E-04	1.09E-04	1.20E-04	1.47E-04	1.06E-04	9.53E-05	1.12E-04	1.03E-04
W-188	69.4 D	4.39E-07	4.06E-07	4.37E-07	6.18E-07	3.94E-07	3.53E-07	4.17E-07	3.91E-07
RE-182	64.0 H	3.85E-04	3.77E-04	4.15E-04	5.28E-04	3.67E-04	3.35E-04	3.91E-04	3.60E-04
RE-182M	12.7 H	2.55E-04	2.54E-04	2.82E-04	3.41E-04	2.48E-04	2.27E-04	2.64E-04	2.43E-04
RE-183	70 D	3.38E-05	3.46E-05	3.43E-05	6.76E-05	3.09E-05	2.79E-05	3.34E-05	3.02E-05
RE-184	38.0 D	2.06E-04	2.01E-04	2.23E-04	2.68E-04	1.96E-04	1.78E-04	2.09E-04	1.92E-04
RE-184M	169 D	8.99E-05	8.74E-05	9.47E-05	1.31E-04	8.40E-05	7.59E-05	8.96E-05	8.24E-05
RE-186	90.64 H	4.81E-06	4.70E-06	4.85E-06	8.80E-06	4.42E-06	3.90E-06	4.75E-06	4.30E-06
RE-187	4.7E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RE-188	16.98 H	1.38E-05	1.32E-05	1.44E-05	1.97E-05	1.29E-05	1.15E-05	1.37E-05	1.26E-05
OS-185	93.6 D	1.66E-04	1.61E-04	1.78E-04	2.16E-04	1.56E-04	1.41E-04	1.66E-04	1.53E-04
OS-186	2.0E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OS-190M	9.9 M	3.84E-04	3.63E-04	4.02E-04	4.96E-04	3.55E-04	3.19E-04	3.76E-04	3.48E-04
OS-191	15.4 D	1.61E-05	1.63E-05	1.65E-05	3.28E-05	1.49E-05	1.32E-05	1.60E-05	1.44E-05
OS-191M	13.03 H	9.35E-07	1.03E-06	9.82E-07	2.98E-06	8.73E-07	7.95E-07	9.42E-07	8.39E-07
OS-193	30.0 H	1.60E-05	1.54E-05	1.66E-05	2.37E-05	1.47E-05	1.32E-05	1.57E-05	1.44E-05
IR-190	11.78 D	3.35E-04	3.19E-04	3.52E-04	4.42E-04	3.11E-04	2.80E-04	3.30E-04	3.05E-04
IR-190M	1.2 H	1.11E-08	1.29E-12	8.88E-10	8.72E-07	1.45E-09	1.93E-11	2.90E-11	4.57E-09
IR-190M	3.2 H	9.56E-06	1.07E-05	1.01E-05	2.33E-05	9.00E-06	8.21E-06	9.73E-06	8.63E-06

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
LU-177	6.71 D	8.27E-06	7.97E-06	8.72E-06	1.28E-05	8.07E-06	6.93E-06	6.56E-06	1.31E-05
LU-177M	160.10 D	2.35E-04	2.26E-04	2.46E-04	3.32E-04	2.38E-04	2.03E-04	1.89E-04	3.39E-04
HF-181	42.39 D	1.29E-04	1.24E-04	1.33E-04	1.65E-04	1.33E-04	1.16E-04	1.05E-04	1.68E-04
TA-182	114.74 D	2.88E-04	2.73E-04	2.91E-04	3.25E-04	2.87E-04	2.58E-04	2.33E-04	3.30E-04
W-181	120.95 D	9.26E-06	8.33E-06	9.23E-06	1.66E-05	4.99E-06	6.76E-06	5.17E-06	1.70E-05
W-185	75.1 D	6.23E-09	6.14E-09	6.78E-09	1.07E-08	5.94E-09	5.29E-09	5.00E-09	1.10E-08
W-187	23.83 H	1.13E-04	1.08E-04	1.16E-04	1.36E-04	1.15E-04	1.03E-04	9.16E-05	1.38E-04
W-188	69.4 D	4.19E-07	4.04E-07	4.38E-07	5.78E-07	4.41E-07	3.63E-07	3.45E-07	5.90E-07
RE-182	64.0 H	3.94E-04	3.75E-04	4.02E-04	4.79E-04	3.90E-04	3.48E-04	3.17E-04	4.89E-04
RE-182M	12.7 H	2.67E-04	2.53E-04	2.69E-04	3.06E-04	2.61E-04	2.38E-04	2.14E-04	3.12E-04
RE-183	70 D	3.63E-05	3.40E-05	3.74E-05	6.05E-05	2.81E-05	2.87E-05	2.49E-05	6.20E-05
RE-184	38.0 D	2.10E-04	1.99E-04	2.13E-04	2.43E-04	2.09E-04	1.91E-04	1.69E-04	2.48E-04
RE-184M	169 D	9.12E-05	8.67E-05	9.36E-05	1.19E-04	8.82E-05	8.01E-05	7.18E-05	1.21E-04
RE-186	90.64 H	4.84E-06	4.66E-06	5.14E-06	8.23E-06	4.15E-06	3.97E-06	3.59E-06	8.46E-06
RE-187	4.7E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RE-188	16.98 H	1.36E-05	1.31E-05	1.42E-05	1.84E-05	1.36E-05	1.20E-05	1.10E-05	1.88E-05
OS-185	93.6 D	1.68E-04	1.59E-04	1.71E-04	1.98E-04	1.69E-04	1.53E-04	1.35E-04	2.01E-04
OS-186	2.0E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OS-190M	9.9 M	3.76E-04	3.61E-04	3.88E-04	4.60E-04	3.95E-04	3.42E-04	3.10E-04	4.67E-04
OS-191	15.4 D	1.68E-05	1.61E-05	1.78E-05	2.98E-05	1.30E-05	1.35E-05	1.18E-05	3.06E-05
OS-191M	13.03 H	1.09E-06	1.01E-06	1.13E-06	2.00E-06	6.48E-07	8.29E-07	6.56E-07	2.06E-06
OS-193	30.0 H	1.59E-05	1.53E-05	1.65E-05	2.19E-05	1.56E-05	1.40E-05	1.26E-05	2.24E-05
IR-190	11.78 D	3.31E-04	3.17E-04	3.41E-04	4.08E-04	3.42E-04	3.00E-04	2.70E-04	4.15E-04
IR-190M	1.2 H	1.57E-11	1.09E-10	8.81E-09	5.29E-09	2.89E-09	4.36E-09	6.51E-09	1.43E-08
IR-190M	3.2 H	1.13E-05	1.05E-05	1.16E-05	2.06E-05	6.66E-06	8.53E-06	6.72E-06	2.12E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
LU-177	6.71 D	1.37E-05	7.83E-06	7.81E-06	1.23E-05	9.36E-06	1.19E-05	6.91E-06	9.58E-06
LU-177M	160.10 D	3.82E-04	2.22E-04	2.22E-04	3.41E-04	2.58E-04	3.24E-04	1.97E-04	2.67E-04
HF-181	42.39 D	2.06E-04	1.21E-04	1.22E-04	1.82E-04	1.37E-04	1.70E-04	1.08E-04	1.44E-04
TA-182	114.74 D	4.46E-04	2.64E-04	2.67E-04	3.88E-04	3.09E-04	3.70E-04	2.39E-04	3.11E-04
W-181	120.95 D	1.86E-05	7.29E-06	7.60E-06	1.53E-05	1.14E-05	1.47E-05	6.21E-06	1.12E-05
W-185	75.1 D	1.02E-08	6.11E-09	6.07E-09	9.55E-09	7.37E-09	9.48E-09	5.35E-09	7.43E-09
W-187	23.83 H	1.80E-04	1.05E-04	1.06E-04	1.56E-04	1.21E-04	1.47E-04	9.34E-05	1.24E-04
W-188	69.4 D	6.73E-07	3.99E-07	3.98E-07	5.99E-07	4.54E-07	5.69E-07	3.55E-07	4.73E-07
RE-182	64.0 H	6.22E-04	3.63E-04	3.67E-04	5.44E-04	4.27E-04	5.19E-04	3.28E-04	4.33E-04
RE-182M	12.7 H	4.17E-04	2.43E-04	2.47E-04	3.62E-04	2.87E-04	3.45E-04	2.21E-04	2.89E-04
RE-183	70 D	6.67E-05	3.19E-05	3.24E-05	5.68E-05	4.29E-05	5.48E-05	2.78E-05	4.29E-05
RE-184	38.0 D	3.33E-04	1.92E-04	1.96E-04	2.87E-04	2.27E-04	2.74E-04	1.72E-04	2.29E-04
RE-184M	169 D	1.49E-04	8.37E-05	8.49E-05	1.29E-04	1.00E-04	1.24E-04	7.45E-05	1.02E-04
RE-186	90.64 H	8.48E-06	4.50E-06	4.52E-06	7.51E-06	5.76E-06	7.37E-06	3.94E-06	5.76E-06
RE-187	4.7E10 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RE-188	16.98 H	2.18E-05	1.28E-05	1.29E-05	1.94E-05	1.50E-05	1.86E-05	1.14E-05	1.53E-05
OS-185	93.6 D	2.67E-04	1.54E-04	1.57E-04	2.31E-04	1.79E-04	2.18E-04	1.38E-04	1.84E-04
OS-186	2.0E15 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OS-190M	9.9 M	5.97E-04	3.53E-04	3.56E-04	5.22E-04	3.98E-04	4.89E-04	3.15E-04	4.16E-04
OS-191	15.4 D	3.23E-05	1.52E-05	1.54E-05	2.67E-05	2.05E-05	2.62E-05	1.33E-05	2.03E-05
OS-191M	13.03 H	3.71E-06	9.07E-07	9.37E-07	1.86E-06	1.37E-06	1.75E-06	7.84E-07	1.42E-06
OS-193	30.0 H	2.65E-05	1.48E-05	1.49E-05	2.30E-05	1.75E-05	2.17E-05	1.32E-05	1.80E-05
IR-190	11.78 D	5.27E-04	3.09E-04	3.12E-04	4.62E-04	3.53E-04	4.33E-04	2.76E-04	3.67E-04
IR-190M	1.2 H	1.86E-06	2.51E-09	2.27E-09	8.08E-08	3.11E-12	5.57E-09	1.08E-12	1.11E-07
IR-190M	3.2 H	2.23E-05	9.35E-06	9.66E-06	1.85E-05	1.41E-05	1.80E-05	8.09E-06	1.37E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
IR-192	74.02 D	2.01E-04	1.88E-04	2.07E-04	2.64E-04	1.83E-04	1.65E-04	1.94E-04	1.81E-04
IR-193M	11.9 D	7.87E-08	7.51E-08	7.30E-08	1.01E-06	6.56E-08	5.82E-08	6.92E-08	6.58E-08
IR-194	19.15 H	2.17E-05	2.05E-05	2.27E-05	2.80E-05	2.01E-05	1.81E-05	2.13E-05	1.98F-05
IR-194M	171 D	5.65E-04	5.34E-04	5.93E-04	7.19E-04	5.23E-04	4.70E-04	5.55E-04	5.13E-04
PT-191	2.71 D	6.67E-05	6.58E-05	6.97E-05	1.07E-04	6.18E-05	5.56E-05	6.58E-05	6.03E-05
PT-193	50 Y	1.09E-08	1.96E-15	8.65E-10	8.50E-07	1.41E-09	1.82E-11	2.68E-11	4.45E-09
PT-193M	4.33 D	2.19E-06	2.37E-06	2.31E-06	5.93E-06	2.06E-06	1.86E-06	2.21E-06	1.97E-06
PT-195M	4.02 D	1.49E-05	1.57E-05	1.55E-05	3.47E-05	1.39E-05	1.25E-05	1.50E-05	1.34E-05
PT-197	18.3 H	5.28E-06	5.29E-06	5.42E-06	1.07E-05	4.90E-06	4.35E-06	5.22E-06	4.73E-06
PT-197M	94.4 M	1.85E-05	1.83E-05	1.90E-05	3.28E-05	1.70E-05	1.53E-05	1.81E-05	1.66E-05
AU-194	39.5 H	2.35E-04	2.31E-04	2.56E-04	3.11E-04	2.27E-04	2.08E-04	2.41E-04	2.23E-04
AU-195	183 D	1.72E-05	1.85E-05	1.81E-05	3.97E-05	1.62E-05	1.46E-05	1.75E-05	1.55E-05
AU-195M	30.6 S	4.93E-05	4.57E-05	4.90E-05	7.20E-05	4.42E-05	3.96E-05	4.68E-05	4.38E-05
AU-196	6.183 D	1.15E-04	1.09E-04	1.18E-04	1.62E-04	1.05E-04	9.42E-05	1.11E-04	1.03E-04
AU-198	2.696 D	9.91E-05	9.30E-05	1.03E-04	1.28E-04	9.07E-05	8.15E-05	9.61E-05	8.93E-05
AU-199	3.139 D	2.19E-05	2.05E-05	2.17E-05	3.54E-05	1.98E-05	1.75E-05	2.11E-05	1.95E-05
HG-197	64.14 H	1.41E-05	1.51E-05	1.49E-05	3.25E-05	1.34E-05	1.20E-05	1.43E-05	1.27E-05
HG-197M	23.8 H	2.15E-05	2.07E-05	2.17E-05	3.92E-05	1.97E-05	1.74E-05	2.11E-05	1.92E-05
HG-203	46.60 D	5.70E-05	5.26E-05	5.68E-05	7.96E-05	5.11E-05	4.58E-05	5.41E-05	5.07E-05
TL-200	26.1 H	2.94E-04	2.86E-04	3.18E-04	3.82E-04	2.80E-04	2.55E-04	2.98E-04	2.75E-04
TL-201	73.06 H	1.99E-05	2.05E-05	2.07E-05	4.17E-05	1.86E-05	1.66E-05	1.99E-05	1.79E-05
TL-202	12.23 D	1.12E-04	1.07E-04	1.17E-04	1.55E-04	1.03E-04	9.24E-05	1.09E-04	1.01E-04
TL-204	3.779 Y	2.28E-07	2.44E-07	2.41E-07	5.25E-07	2.16E-07	1.93E-07	2.31E-07	2.06E-07
TL-207	4.77 M	5.03E-07	4.88E-07	5.49E-07	6.14E-07	4.82E-07	4.37E-07	5.13E-07	4.71E-07
TL-208	3.053 M	6.79E-04	6.89E-04	7.65E-04	8.76E-04	6.87E-04	6.39E-04	7.30E-04	6.76E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
IR-192	74.02 D	1.95E-04	1.87E-04	2.02E-04	2.46E-04	2.06E-04	1.75E-04	1.61E-04	2.51E-04
IR-193M	11.9 D	7.88E-08	7.40E-08	9.01E-08	1.50E-07	5.09E-08	6.45E-08	5.43E-08	1.63E-07
IR-194	19.15 H	2.13E-05	2.04E-05	2.19E-05	2.59E-05	2.24E-05	1.91E-05	1.76E-05	2.64E-05
IR-194M	171 D	5.55E-04	5.31E-04	5.71E-04	6.66E-04	5.83E-04	5.06E-04	4.57E-04	6.77E-04
PT-191	2.71 D	6.84E-05	6.52E-05	7.08E-05	9.84E-05	6.24E-05	5.89E-05	5.18E-05	1.01E-04
PT-193	50 Y	1.30E-11	1.05E-10	8.58E-09	5.15E-09	2.82E-09	4.25E-09	6.34E-09	1.39E-08
PT-193M	4.33 D	2.48E-06	2.34E-06	2.59E-06	4.57E-06	1.57E-06	1.92E-06	1.55E-06	4.70E-06
PT-195M	4.02 D	1.64E-05	1.56E-05	1.72E-05	2.99E-05	1.12E-05	1.29E-05	1.07E-05	3.07E-05
PT-197	18.3 H	5.44E-06	5.26E-06	5.78E-06	9.44E-06	4.41E-06	4.43E-06	3.91E-06	9.69E-06
PT-197M	94.4 M	1.90E-05	1.81E-05	1.97E-05	2.89E-05	1.68E-05	1.59E-05	1.41E-05	2.96E-05
AU-194	39.5 H	2.43E-04	2.31E-04	2.46E-04	2.81E-04	2.45E-04	2.14E-04	1.98E-04	2.86E-04
AU-195	183 D	1.92E-05	1.82E-05	2.02E-05	3.53E-05	1.27E-05	1.50E-05	1.23E-05	3.63E-05
AU-195M	30.6 S	4.71E-05	4.55E-05	4.93E-05	6.64E-05	4.89E-05	4.06E-05	3.85E-05	6.78E-05
AU-196	6.183 D	1.12E-04	1.08E-04	1.17E-04	1.50E-04	1.15E-04	9.92E-05	9.10E-05	1.53E-04
AU-198	2.696 D	9.62E-05	9.25E-05	9.95E-05	1.19E-04	1.02E-04	8.73E-05	7.97E-05	1.21E-04
AU-199	3.139 D	2.09E-05	2.04E-05	2.24E-05	3.35E-05	2.04E-05	1.76E-05	1.67E-05	3.43E-05
HG-197	64.14 H	1.57E-05	1.50E-05	1.65E-05	2.89E-05	1.04E-05	1.23E-05	1.01E-05	2.97E-05
HG-197M	23.8 H	2.12E-05	2.06E-05	2.27E-05	3.58E-05	1.89E-05	1.77E-05	1.61E-05	3.67E-05
HG-203	46.60 D	5.43E-05	5.24E-05	5.68E-05	7.46E-05	5.72E-05	4.73E-05	4.48E-05	7.61E-05
TL-200	26.1 H	2.99E-04	2.85E-04	3.04E-04	3.47E-04	3.04E-04	2.69E-04	2.44E-04	3.53E-04
TL-201	73.06 H	2.12E-05	2.04E-05	2.24E-05	3.79E-05	1.58E-05	1.70E-05	1.45E-05	3.90E-05
TL-202	12.23 D	1.10E-04	1.06E-04	1.14E-04	1.43E-04	1.12E-04	9.89E-05	8.89E-05	1.46E-04
TL-204	3.779 Y	2.53E-07	2.42E-07	2.67E-07	4.69E-07	1.68E-07	1.99E-07	1.63E-07	4.82E-07
TL-207	4.77 M	5.11E-07	4.85E-07	5.17E-07	5.57E-07	5.24E-07	4.71E-07	4.18E-07	5.67E-07
TL-208	3.053 M	7.40E-04	6.92E-04	7.27E-04	7.63E-04	7.43E-04	6.27E-04	6.05E-04	7.75E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
IR-192	74.02 D	3.08E-04	1.84E-04	1.85E-04	2.72E-04	2.06E-04	2.55E-04	1.64E-04	2.16E-04
IR-193M	11.9 D	1.96E-06	6.88E-08	7.06E-08	2.07E-07	9.89E-08	1.31E-07	5.77E-08	2.03E-07
IR-194	19.15 H	3.34E-05	2.00E-05	2.01E-05	2.94E-05	2.26E-05	2.77E-05	1.79E-05	2.34E-05
IR-194M	171 D	8.75E-04	5.19E-04	5.25E-04	7.66E-04	5.85E-04	7.16E-04	4.64E-04	6.11E-04
PT-191	2.71 D	1.17E-04	6.23E-05	6.32E-05	1.01E-04	7.68E-05	9.58E-05	5.52E-05	7.82E-05
PT-193	50 Y	1.81E-06	2.45E-09	2.21E-09	7.87E-08	1.81E-12	5.43E-09	7.91E-13	1.09E-07
PT-193M	4.33 D	6.68E-06	2.12E-06	2.18E-06	4.12E-06	3.11E-06	3.97E-06	1.85E-06	3.12E-06
PT-195M	4.02 D	3.52E-05	1.43E-05	1.46E-05	2.67E-05	2.04E-05	2.61E-05	1.25E-05	2.01E-05
PT-197	18.3 H	1.11E-05	4.99E-06	5.04E-06	8.56E-06	6.58E-06	8.37E-06	4.39E-06	6.57E-06
PT-197M	94.4 M	3.58E-05	1.73E-05	1.75E-05	2.86E-05	2.17E-05	2.72E-05	1.53E-05	2.21E-05
AU-194	39.5 H	3.75E-04	2.23E-04	2.26E-04	3.28E-04	2.56E-04	3.09E-04	2.04E-04	2.63E-04
AU-195	183 D	3.88E-05	1.67E-05	1.71E-05	3.13E-05	2.40E-05	3.07E-05	1.45E-05	2.35E-05
AU-195M	30.6 S	7.85E-05	4.48E-05	4.47E-05	6.80E-05	5.15E-05	6.47E-05	3.99E-05	5.36E-05
AU-196	6.183 D	1.83E-04	1.06E-04	1.06E-04	1.61E-04	1.21E-04	1.51E-04	9.41E-05	1.27E-04
AU-198	2.696 D	1.52E-04	9.07E-05	9.13E-05	1.34E-04	1.01E-04	1.25E-04	8.11E-05	1.07E-04
AU-199	3.139 D	3.53E-05	2.01E-05	2.00E-05	3.14E-05	2.41E-05	3.07E-05	1.78E-05	2.45E-05
HG-197	64.14 H	3.21E-05	1.37E-05	1.40E-05	2.55E-05	1.97E-05	2.51E-05	1.20E-05	1.91E-05
HG-197M	23.8 H	3.98E-05	2.00E-05	2.01E-05	3.28E-05	2.52E-05	3.21E-05	1.76E-05	2.54E-05
HG-203	46.60 D	8.71E-05	5.17E-05	5.16E-05	7.76E-05	5.88E-05	7.35E-05	4.61E-05	6.13E-05
TL-200	26.1 H	4.67E-04	2.76E-04	2.79E-04	4.07E-04	3.18E-04	3.85E-04	2.50E-04	3.25E-04
TL-201	73.06 H	4.08E-05	1.90E-05	1.93E-05	3.38E-05	2.61E-05	3.32E-05	1.67E-05	2.56E-05
TL-202	12.23 D	1.80E-04	1.03E-04	1.04E-04	1.57E-04	1.18E-04	1.46E-04	9.19E-05	1.24E-04
TL-204	3.779 Y	5.18E-07	2.21E-07	2.26E-07	4.12E-07	3.18E-07	4.05E-07	1.94E-07	3.09E-07
TL-207	4.77 M	7.91E-07	4.70E-07	4.79E-07	6.84E-07	5.45E-07	6.53E-07	4.22E-07	5.50E-07
TL-208	3.053 M	1.06E-03	6.65E-04	6.83E-04	9.50E-04	7.43E-04	8.68E-04	6.19E-04	7.69E-04

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
TL-209	2.20 M	4.43E-04	4.40E-04	4.92E-04	5.73E-04	4.35E-04	3.99E-04	4.63E-04	4.26E-04
TL-210	1.30 M	6.02E-04	5.93E-04	6.64E-04	7.59E-04	5.87E-04	5.38E-04	6.24E-04	5.76E-04
PB-203	52.02 H	7.31E-05	6.93E-05	7.39E-05	1.12E-04	6.63E-05	5.94E-05	7.03E-05	6.53E-05
PB-204M	66.9 M	4.88E-04	4.70E-04	5.27E-04	6.04E-04	4.63E-04	4.20E-04	4.93E-04	4.54E-04
PB-205	1.51E7 Y	1.55E-08	7.28E-15	1.28E-09	1.14E-06	2.07E-09	3.26E-11	2.76F-11	6.54E-09
PB-209	3.253 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB-210	22.26 Y	3.05E-07	3.73E-07	2.70E-07	2.31E-06	2.44E-07	2.44E-07	3.03E-07	2.61E-07
PB-211	36.1 M	1.21E-05	1.16F-05	1.29E-05	1.52E-05	1.14E-05	1.03E-05	1.21E-05	1.12E-05
PB-212	10.643 H	3.61E-05	3.38E-05	3.60E-05	5.54E-05	3.26E-05	2.91E-05	3.45E-05	3.21E-05
PB-214	26.8 M	6.11E-05	5.71E-05	6.22E-05	8.43E-05	5.55E-05	4.98E-05	5.88E-05	5.48E-05
BI-206	6.243 D	7.41E-04	7.23E-04	8.08E-04	9.40E-04	7.12E-04	6.47E-04	7.57E-04	6.97E-04
BI-207	33.4 Y	3.46E-04	3.38E-04	3.78E-04	4.41E-04	3.32E-04	3.02E-04	3.53E-04	3.25E-04
BI-208	3.68E5 Y	5.05E-04	5.24E-04	5.79E-04	6.65E-04	5.24E-04	4.92E-04	5.57E-04	5.16E-04
BI-210	5.013 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BI-211	2.13 M	1.17E-05	1.09E-05	1.19E-05	1.57E-05	1.06E-05	9.54E-06	1.12E-05	1.05E-05
BI-212	60.55 M	4.09E-05	4.00E-05	4.49E-05	5.12E-05	3.95E-05	3.60E-05	4.20E-05	3.87E-05
BI-213	45.65 M	3.36E-05	3.18E-05	3.52E-05	4.36E-05	3.10E-05	2.79E-05	3.29E-05	3.05E-05
BI-214	19.9 M	3.20E-04	3.19E-04	3.58E-04	4.02E-04	3.16E-04	2.90E-04	3.36E-04	3.10E-04
PO-209	102 Y	8.17E-07	7.83E-07	8.65E-07	1.08E-06	7.66E-07	6.92E-07	8.15E-07	7.52E-07
PO-210	138.378 D	2.00E-09	1.93E-09	2.17E-09	2.45E-09	1.91E-09	1.72E-09	2.03E-09	1.86E-09
PO-211	0.516 S	1.82E-06	1.75E-06	1.97E-06	2.24E-06	1.73E-06	1.56E-06	1.84E-06	1.69E-06
PO-212	2.98E-7 S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PO-213	4.2E-6 S	7.20E-09	6.93E-09	7.79E-09	8.80E-09	6.83E-09	6.18E-09	7.27E-09	6.68E-09
PO-214	1.637E-4 S	1.96E-08	1.89E-08	2.13E-08	2.40E-08	1.87E-08	1.69E-08	1.99E-08	1.83E-08
PO-215	1.778E-3 S	3.63E-08	3.42E-08	3.79E-08	4.64E-08	3.34E-08	3.00E-08	3.54E-08	3.28E-08

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
TL-209	2.20 M	4.62E-04	4.40E-04	4.67E-04	5.15E-04	4.68E-04	4.11E-04	3.79E-04	5.24E-04
TL-210	1.30 M	6.25E-04	5.92E-04	6.29E-04	6.81E-04	6.38E-04	5.57E-04	5.13E-04	6.92E-04
PB-203	52.02 H	7.15E-05	6.89E-05	7.49E-05	1.04E-04	7.04E-05	6.14E-05	5.67E-05	1.06E-04
PB-204M	66.9 M	4.92E-04	4.67E-04	4.99E-04	5.51E-04	5.07E-04	4.51E-04	4.03E-04	5.60E-04
PB-205	1.51E7 Y	2.55E-11	1.80E-10	1.25E-08	7.94E-09	4.12E-09	6.20E-09	9.12E-09	2.03E-08
PB-209	3.253 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB-210	22.26 Y	4.41E-07	3.33E-07	3.88E-07	6.80E-07	1.74E-07	2.77E-07	2.01E-07	7.12E-07
PB-211	36.1 M	1.21E-05	1.15E-05	1.23E-05	1.40E-05	1.26E-05	1.11E-05	9.93E-06	1.42E-05
PB-212	10.643 H	3.48E-05	3.37E-05	3.67E-05	5.18E-05	3.48E-05	2.97E-05	2.79E-05	5.30E-05
PB-214	26.8 M	5.90E-05	5.69E-05	6.14E-05	7.83E-05	6.17E-05	5.22E-05	4.85E-05	7.98E-05
BI-206	6.243 D	7.57E-04	7.20E-04	7.68E-04	8.52E-04	7.72E-04	6.86E-04	6.19E-04	8.67E-04
BI-207	33.4 Y	3.53E-04	3.36E-04	3.59E-04	4.00E-04	3.59E-04	3.21E-04	2.88E-04	4.07E-04
BI-208	3.68E5 Y	5.67E-04	5.27E-04	5.51E-04	5.68E-04	5.61E-04	4.67E-04	4.62E-04	5.77E-04
BI-210	5.013 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BI-211	2.13 M	1.13E-05	1.09E-05	1.17E-05	1.47E-05	1.19E-05	1.01E-05	9.32E-06	1.50E-05
BI-212	60.55 M	4.20E-05	3.99E-05	4.24E-05	4.59E-05	4.30E-05	3.82E-05	3.44E-05	4.67E-05
BI-213	45.65 M	3.29E-05	3.16E-05	3.40E-05	4.04E-05	3.46E-05	2.99E-05	2.71E-05	4.11E-05
BI-214	19.9 M	3.36E-04	3.19E-04	3.37E-04	3.58E-04	3.42E-04	3.00E-04	2.76E-04	3.64E-04
PO-209	102 Y	8.16E-07	7.79E-07	8.36E-07	9.96E-07	8.28E-07	7.33E-07	6.63E-07	1.01E-06
PO-210	138.378 D	2.02E-09	1.92E-09	2.05E-09	2.23E-09	2.08E-09	1.87E-09	1.66E-09	2.27E-09
PO-211	0.516 S	1.83E-06	1.74E-06	1.86E-06	2.05E-06	1.90E-06	1.69E-06	1.50E-06	2.08E-06
PO-212	2.98E-7 S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PO-213	4.2E-6 S	7.25E-09	6.89E-09	7.36E-09	8.04E-09	7.48E-09	6.70E-09	5.94E-09	8.17E-09
PO-214	1.637E-4 S	1.98E-08	1.88E-08	2.01E-08	2.19E-08	2.04E-08	1.83E-08	1.62E-08	2.23E-08
PO-215	1.778E-3 S	3.54E-08	3.40E-08	3.65E-08	4.31E-08	3.76E-08	3.23E-08	2.93E-08	4.38E-08

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
TL-209	2.20 M	7.03E-04	4.26E-04	4.30E-04	6.17E-04	4.84E-04	5.79E-04	3.91E-04	4.97E-04
TL-210	1.30 M	9.47E-04	5.73E-04	5.82E-04	8.28E-04	6.54E-04	7.79E-04	5.24E-04	6.68E-04
PB-203	52.02 H	1.20E-04	6.72E-05	6.74E-05	1.05E-04	7.96E-05	9.99E-05	5.97E-05	8.18E-05
PB-204M	66.9 M	7.64E-04	4.54E-04	4.62E-04	6.63E-04	5.24E-04	6.30E-04	4.08E-04	5.32E-04
PB-205	1.51E7 Y	2.38E-06	3.67E-09	3.35E-09	1.12E-07	3.99E-12	8.41E-09	1.05E-12	1.50E-07
PB-209	3.253 H	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB-210	22.26 Y	3.71E-06	2.79E-07	2.99E-07	8.64E-07	4.92E-07	6.54E-07	2.26E-07	6.91E-07
PB-211	36.1 M	1.89E-05	1.12E-05	1.14E-05	1.65E-05	1.28E-05	1.55E-05	1.01E-05	1.32E-05
PB-212	10.643 H	5.79E-05	3.31E-05	3.30E-05	5.11E-05	3.90E-05	4.91E-05	2.94E-05	4.00E-05
PB-214	26.8 M	9.54E-05	5.59E-05	5.60E-05	8.38E-05	6.35E-05	7.89E-05	4.98E-05	6.63E-05
BI-206	6.243 D	1.18E-03	6.97E-04	7.08E-04	1.02E-03	8.02E-04	9.64E-04	6.31E-04	8.19E-04
BI-207	33.4 Y	5.52E-04	3.25E-04	3.31E-04	4.78E-04	3.76E-04	4.52E-04	2.94E-04	3.83E-04
BI-208	3.68E5 Y	7.90E-04	5.05E-04	5.20E-04	7.16E-04	5.62E-04	6.49E-04	4.75E-04	5.81E-04
BI-210	5.013 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BI-211	2.13 M	1.80E-05	1.07E-05	1.07E-05	1.59E-05	1.20E-05	1.49E-05	9.55E-06	1.26E-05
BI-212	60.55 M	6.54E-05	3.85E-05	3.92E-05	5.62E-05	4.43E-05	5.30E-05	3.50E-05	4.52E-05
BI-213	45.65 M	5.23E-05	3.09E-05	3.12E-05	4.59E-05	3.47E-05	4.27E-05	2.77E-05	3.65E-05
BI-214	19.9 M	5.07E-04	3.07E-04	3.12E-04	4.43E-04	3.50E-04	4.15E-04	2.83E-04	3.58E-04
PO-209	102 Y	1.30E-06	7.58E-07	7.68E-07	1.13E-06	8.84E-07	1.08E-06	6.78E-07	8.98E-07
PO-210	138.378 D	3.15E-09	1.86E-09	1.90E-09	2.72E-09	2.15E-09	2.58E-09	1.67E-09	2.19E-09
PO-211	0.516 S	2.86E-06	1.69E-06	1.72E-06	2.48E-06	1.94E-06	2.34E-06	1.52E-06	1.99E-06
PO-212	2.98E-7 S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PO-213	4.2E-6 S	1.13E-08	6.69E-09	6.82E-09	9.77E-09	7.71E-09	9.27E-09	5.99E-09	7.85E-09
PO-214	1.637E-4 S	3.08E-08	1.83E-08	1.86E-08	2.67E-08	2.11E-08	2.53E-08	1.64E-08	2.14E-08
PO-215	1.778E-3 S	5.59E-08	3.33E-08	3.35E-08	4.92E-08	3.71E-08	4.56E-08	2.98E-08	3.91E-08

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	H	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
PO-216	0.146 S	3.41E-09	3.29E-09	3.70E-09	4.17E-09	3.2	2.94E-09	3.45E-09	3.17E-09
PO-218	3.05 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AT-211	7.214 H	8.41E-06	8.63E-06	8.82E-06	1.78E-05	7.9	7.01E-06	8.50E-06	7.59E-06
AT-217	0.0323 S	5.69E-08	5.43E-08	6.07E-08	7.07E-08	5.3	.79E-08	5.65E-08	5.21E-08
RN-218	0.035 S	1.81E-07	1.72E-07	1.93E-07	2.24E-07	1.6	1.52E-07	1.80E-07	1.66E-07
RN-219	3.96 S	1.42E-05	1.32E-05	1.44E-05	1.92E-05	1.2	1.15E-05	1.36E-05	1.27E-05
RN-220	55.61 S	1.25E-07	1.19E-07	1.33E-07	1.57E-07	1.1	1.05E-07	1.24E-07	1.14E-07
RN-222	3.8235 D	9.33E-08	8.86E-08	9.88E-08	1.18E-07	8.6	.79E-08	9.19E-08	8.49E-08
FR-221	4.8 M	7.71E-06	7.09E-06	7.57E-06	1.14E-05	6.8	.14E-06	7.30E-06	6.83E-06
FR-223	21.8 M	1.11E-05	1.13E-05	1.12E-05	2.39E-05	1.0	.10E-06	1.09E-05	9.90E-06
RA-222	38.0 S	2.29E-06	2.12E-06	2.32E-06	3.07E-06	2.0	1.86E-06	2.19E-06	2.05E-06
RA-223	11.434 D	3.25E-05	3.08E-05	3.28E-05	5.23E-05	2.9	2.63E-05	3.15E-05	2.90E-05
RA-224	3.62 D	2.51E-06	2.30E-06	2.47E-06	3.57E-06	2.2	2.00E-06	2.37E-06	2.23E-06
RA-225	14.8 D	1.74E-06	2.51E-06	1.41E-06	8.08E-06	1.3	.44E-06	1.93E-06	1.50E-06
RA-226	1600 Y	1.68E-06	1.54E-06	1.64E-06	2.58E-06	1.5	.33E-06	1.60E-06	1.49E-06
RA-228	5.75 Y	1.30E-14	2.34E-21	1.03E-15	1.02E-12	1.6	2.18E-17	3.21E-17	5.32E-15
AC-225	10.0 D	3.23E-06	3.06E-06	3.22E-06	7.04E-06	2.9	2.57E-06	3.15E-06	2.87E-06
AC-227	21.773 Y	3.06E-08	2.65E-08	2.84E-08	1.52E-07	2.6	2.24E-08	2.79E-08	2.64E-08
AC-228	6.13 H	2.09E-04	2.03E-04	2.28E-04	2.65E-04	2.01	.82E-04	2.14E-04	1.97E-04
TH-226	30.9 M	1.89E-06	1.76E-06	1.87E-06	3.64E-06	1.72	.50E-06	1.84E-06	1.68E-06
TH-227	18.718 D	2.59E-05	2.41E-05	2.57E-05	4.11E-05	2.32	.08E-05	2.46E-05	2.30E-05
TH-228	1.9132 Y	4.74E-07	4.43E-07	4.65E-07	1.54E-06	4.24	.72E-07	4.50E-07	4.17E-07
TH-229	7.34E3 Y	2.04E-05	1.96E-05	2.04E-05	4.25E-05	1.87	.64E-05	2.01E-05	1.82E-05
TH-230	7.7E4 Y	9.55E-08	8.47E-08	8.62E-08	8.23E-07	7.84	.84E-08	8.16E-08	8.03E-08
TH-231	25.52 H	2.72E-06	2.59E-06	2.58E-06	1.24E-05	2.36	2.05E-06	2.63E-06	2.37E-06

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
PO-216	0.146 S	3.44E-09	3.27E-09	3.49E-09	3.80E-09	3.55E-09	3.18E-09	2.82E-09	3.86E-09
PO-218	3.05 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AT-211	7.214 H	8.84E-06	8.58E-06	9.48E-06	1.61E-05	6.61E-06	7.19E-06	6.15E-06	1.66E-05
AT-217	0.0323 S	5.64E-08	5.39E-08	5.78E-08	6.51E-08	5.90E-08	5.22E-08	4.64E-08	6.62E-08
RN-218	0.035 S	1.79E-07	1.71E-07	1.84E-07	2.06E-07	1.87E-07	1.66E-07	1.48E-07	2.10E-07
RN-219	3.96 S	1.36E-05	1.31E-05	1.42E-05	1.79E-05	1.45E-05	1.21E-05	1.13E-05	1.83E-05
RN-220	55.61 S	1.24E-07	1.18E-07	1.27E-07	1.45E-07	1.30E-07	1.14E-07	1.02E-07	1.47E-07
RN-222	3.8235 D	9.19E-08	8.81E-08	9.46E-08	1.09E-07	9.68E-08	8.46E-08	7.58E-08	1.11E-07
FR-221	4.8 M	7.29E-06	7.06E-06	7.69E-06	1.07E-05	7.57E-06	6.22E-06	5.98E-06	1.09E-05
FR-223	21.8 M	1.20E-05	1.10E-05	1.22E-05	1.88E-05	9.42E-06	9.61E-06	8.26E-06	1.93E-05
RA-222	38.0 S	2.19E-06	2.11E-06	2.28E-06	2.86E-06	2.35E-06	1.94E-06	1.82E-06	2.92E-06
RA-223	11.434 D	3.16E-05	3.07E-05	3.35E-05	4.85E-05	3.05E-05	2.71E-05	2.50E-05	4.97E-05
RA-224	3.62 D	2.37E-06	2.29E-06	2.49E-06	3.35E-06	2.51E-06	2.04E-06	1.96E-06	3.42E-06
RA-225	14.8 D	3.25E-06	2.03E-06	2.29E-06	4.05E-06	9.53E-07	1.66E-06	1.12E-06	4.15E-06
RA-226	1600 Y	1.58E-06	1.54E-06	1.68E-06	2.42E-06	1.61E-06	1.34E-06	1.29E-06	2.48E-06
RA-228	5.75 Y	1.55E-17	1.26E-16	1.03E-14	6.16E-15	3.37E-15	5.08E-15	7.58E-15	1.66E-14
AC-225	10.0 D	3.13E-06	3.05E-06	3.38E-06	5.31E-06	2.83E-06	2.63E-06	2.43E-06	5.48E-06
AC-227	21.773 Y	2.69E-08	2.65E-08	3.16E-08	4.91E-08	2.55E-08	2.39E-08	2.27E-08	5.21E-08
AC-228	6.13 H	2.13E-04	2.02E-04	2.16E-04	2.37E-04	2.18E-04	1.94E-04	1.75E-04	2.42E-04
TH-226	30.9 M	1.80E-06	1.76E-06	1.95E-06	2.96E-06	1.72E-06	1.53E-06	1.44E-06	3.05E-06
TH-227	18.718 D	2.49E-05	2.39E-05	2.60E-05	3.54E-05	2.54E-05	2.14E-05	2.02E-05	3.62E-05
TH-228	1.9132 Y	4.54E-07	4.42E-07	4.99E-07	7.79E-07	4.07E-07	3.84E-07	3.54E-07	8.10E-07
TH-229	7.34E3 Y	2.02E-05	1.95E-05	2.17E-05	3.48E-05	1.75E-05	1.67E-05	1.52E-05	3.58E-05
TH-230	7.7E4 Y	8.79E-08	8.43E-08	1.04E-07	1.65E-07	6.98E-08	7.61E-08	6.81E-08	1.78E-07
TH-231	25.52 H	2.79E-06	2.53E-06	3.00E-06	4.96E-06	2.05E-06	2.23E-06	1.96E-06	5.21E-06

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
PO-216	0.145 S	5.36E-09	3.17E-09	3.24E-09	4.63E-09	3.67E-09	4.40E-09	2.84E-09	3.72E-09
PO-218	3.05 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AT-211	7.214 H	1.76E-05	8.07E-06	8.18E-06	1.42E-05	1.10E-05	1.40E-05	7.07E-06	1.08E-05
AT-217	0.0323 S	8.88E-08	5.25E-08	5.33E-08	7.73E-08	5.94E-08	7.22E-08	4.70E-08	6.18E-08
RN-218	0.035 S	2.82E-07	1.67E-07	1.69E-07	2.45E-07	1.89E-07	2.29E-07	1.49E-07	1.96E-07
RN-219	3.96 S	2.17E-05	1.29E-05	1.30E-05	1.93E-05	1.45E-05	1.81E-05	1.16E-05	1.53E-05
RN-220	55.61 S	1.95E-07	1.15E-07	1.17E-07	1.70E-07	1.30E-07	1.58E-07	1.03E-07	1.36E-07
RN-222	3.8235 D	1.45E-07	8.60E-08	8.69E-08	1.27E-07	9.61E-08	1.18E-07	7.70E-08	1.01E-07
FR-221	4.8 M	1.19E-05	7.00E-06	6.96E-06	1.06E-05	8.08E-06	1.02E-05	6.22E-06	8.35E-06
FR-223	21.8 M	2.62E-05	1.04E-05	1.06E-05	1.89E-05	1.38E-05	1.76E-05	8.94E-06	1.44E-05
RA-222	38.0 S	3.48E-06	2.09E-06	2.08E-06	3.09E-06	2.33E-06	2.90E-06	1.86E-06	2.45E-06
RA-223	11.434 D	5.48E-05	3.00E-05	3.00E-05	4.72E-05	3.59E-05	4.54E-05	2.65E-05	3.68E-05
RA-224	3.62 D	3.82E-06	2.27E-06	2.26E-06	3.41E-06	2.59E-06	3.25E-06	2.03E-06	2.69E-06
RA-225	14.8 D	9.25E-06	1.61E-06	1.76E-06	5.25E-06	3.21E-06	4.26E-06	1.29E-06	3.61E-06
RA-226	1600 Y	2.64E-06	1.53E-06	1.52E-06	2.33E-06	1.78E-06	2.26E-06	1.35E-06	1.83E-06
RA-228	5.75 Y	2.17E-12	2.93E-15	2.64E-15	9.41E-14	2.17E-18	6.49E-15	9.46E-19	1.30E-13
AC-225	10.0 D	8.19E-06	2.99E-06	2.99E-06	5.01E-06	3.70E-06	4.76E-06	2.61E-06	3.96E-06
AC-227	21.773 Y	2.33E-07	2.70E-08	2.69E-08	5.88E-08	3.21E-08	4.39E-08	2.28E-08	5.05E-08
AC-228	6.13 H	3.35E-04	1.96E-04	2.00E-04	2.87E-04	2.26E-04	2.72E-04	1.77E-04	2.31E-04
TH-226	30.9 M	4.05E-06	1.74E-06	1.73E-06	2.81E-06	2.09E-06	2.69E-06	1.53E-06	2.22E-06
TH-227	18.718 D	4.63E-05	2.35E-05	2.35E-05	3.65E-05	2.73E-05	3.44E-05	2.09E-05	2.88E-05
TH-228	1.9132 Y	2.16E-06	4.33E-07	4.34E-07	8.04E-07	5.39E-07	7.00E-07	3.77E-07	6.58E-07
TH-229	7.34E3 Y	4.58E-05	1.90E-05	1.90E-05	3.22E-05	2.40E-05	3.09E-05	1.66E-05	2.50E-05
TH-230	7.7E4 Y	1.40E-06	8.24E-08	8.35E-08	2.33E-07	1.07E-07	1.48E-07	6.85E-08	2.12E-07
TH-231	25.52 H	1.74E-05	2.46E-06	2.50E-06	5.74E-06	3.22E-06	4.48E-06	2.04E-06	4.61E-06

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PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
TH-232	1.405E10 Y	4.86E-08	3.76E-08	3.76E-08	7.34E-07	3.47E-08	2.95E-08	3.54E-08	3.82E-08
TH-233	22.3 M	8.06E-06	7.68E-06	8.41E-06	1.20E-05	7.44E-06	6.67E-06	7.94E-06	7.31E-06
TH-234	24.10 D	1.79E-06	1.81E-06	1.83E-06	4.42E-06	1.66E-06	1.46E-06	1.79E-06	1.60E-06
PA-230	17.4 D	1.52E-04	1.47E-04	1.64E-04	2.01E-04	1.45E-04	1.30E-04	1.54E-04	1.41E-04
PA-231	3.276E4 Y	7.45E-06	6.86E-06	7.34E-06	1.46E-05	6.61E-06	5.91E-06	7.08E-06	6.60E-06
PA-233	27.0 D	5.25E-05	4.88E-05	5.29E-05	7.89E-05	4.75E-05	4.23E-05	5.04E-05	4.69E-05
PA-234	6.70 H	4.49E-04	4.35E-04	4.86E-04	5.78E-04	4.28E-04	3.88E-04	4.56E-04	4.19E-04
PA-234M	1.17 M	2.60E-06	2.53E-06	2.84E-06	3.28E-06	2.50E-06	2.27E-06	2.66E-06	2.44E-06
U-230	20.8 D	2.73E-07	2.42E-07	2.54E-07	1.50E-06	2.32E-07	2.02E-07	2.42E-07	2.35E-07
U-231	4.2 D	1.61E-05	1.55E-05	1.61E-05	3.88E-05	1.47E-05	1.28E-05	1.60E-05	1.43E-05
U-232	72 Y	7.31E-08	5.01E-08	5.21E-08	1.15E-06	4.88E-08	4.03E-08	4.83E-08	5.61E-08
U-233	1.592E5 Y	5.96E-08	4.86E-08	5.25E-08	4.30E-07	4.89E-08	4.11E-08	5.12E-08	5.02E-08
U-234	2.445E5 Y	4.50E-08	2.49E-08	2.62E-08	9.69E-07	2.51E-08	1.97E-08	2.37E-08	3.21E-08
U-235	7.038E8 Y	3.76E-05	3.45E-05	3.68E-05	5.94E-05	3.37E-05	2.98E-05	3.58E-05	3.33E-05
U-236	2.3415E7 Y	3.62E-08	1.73E-08	1.92E-08	9.07E-07	1.85E-08	1.38E-08	1.61E-08	2.48E-08
U-237	6.75 D	3.23E-05	3.09E-05	3.21E-05	6.23E-05	2.93E-05	2.59E-05	3.14E-05	2.87E-05
U-238	4.468E9 Y	3.14E-08	1.47E-08	1.63E-08	8.02E-07	1.57E-08	1.17E-08	1.36E-08	2.14E-08
U-239	23.40 M	1.05E-05	1.09E-05	1.11E-05	2.16E-05	9.88E-06	8.85E-06	1.06E-05	9.50E-06
U-240	14.1 H	2.19E-07	1.44E-07	1.10E-07	4.53E-06	1.07E-07	9.21E-08	1.15E-07	1.54E-07
NP-235	396.1 D	5.09E-07	4.02E-07	4.32E-07	4.29E-06	4.04E-07	3.36E-07	4.19E-07	4.23E-07
NP-236	1.15E6 Y	3.12E-05	2.92E-05	3.09E-05	6.56E-05	2.84E-05	2.46E-05	3.05E-05	2.77E-05
NP-236M	22.5 H	1.20E-05	1.15E-05	1.22E-05	2.27E-05	1.11E-05	9.69E-06	1.20E-05	1.08E-05
NP-237	2.14E6 Y	5.42E-06	5.31E-06	5.27E-06	1.66E-05	4.84E-06	4.25E-06	5.34E-06	4.79E-06
NP-238	2.117 D	1.24E-04	1.21E-04	1.36E-04	1.55E-04	1.20E-04	1.09E-04	1.27E-04	1.17E-04
NP-239	2.355 D	4.07E-05	3.79E-05	4.04E-05	6.93E-05	3.68E-05	3.24E-05	3.94E-05	3.62E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
TH-232	1.405E10 Y	3.99E-08	3.73E-08	5.29E-08	8.07E-08	3.06E-08	3.67E-08	3.33E-08	9.20E-08
TH-233	22.3 M	7.99E-06	7.62E-06	8.25E-06	1.02E-05	8.06E-06	7.17E-06	6.44E-06	1.04E-05
TH-234	24.10 D	1.86E-06	1.79E-06	2.00E-06	3.42E-06	1.39E-06	1.51E-06	1.30E-06	3.53E-06
PA-230	17.4 D	1.53E-04	1.46E-04	1.57E-04	1.80E-04	1.55E-04	1.40E-04	1.25E-04	1.84E-04
PA-231	3.276E4 Y	7.18E-06	6.79E-06	7.47E-06	9.83E-06	7.36E-06	6.20E-06	5.83E-06	1.01E-05
PA-233	27.0 D	5.03E-05	4.86E-05	5.29E-05	7.05E-05	5.20E-05	4.41E-05	4.12E-05	7.20E-05
PA-234	6.70 H	4.54E-04	4.32E-04	4.62E-04	5.19E-04	4.64E-04	4.14E-04	3.72E-04	5.29E-04
PA-234M	1.17 M	2.65E-06	2.52E-06	2.69E-06	2.94E-06	2.70E-06	2.43E-06	2.17E-06	3.00E-06
U-230	20.8 D	2.49E-07	2.41E-07	2.87E-07	4.32E-07	2.27E-07	2.17E-07	2.02E-07	4.58E-07
U-231	4.2 D	1.59E-05	1.54E-05	1.73E-05	2.85E-05	1.33E-05	1.32E-05	1.19E-05	2.95E-05
U-232	72 Y	5.31E-08	5.04E-08	7.72E-08	1.12E-07	4.67E-08	5.32E-08	5.04E-08	1.30E-07
U-233	1.592E5 Y	4.95E-08	4.88E-08	6.12E-08	9.31E-08	4.78E-08	4.55E-08	4.37E-08	1.01E-07
U-234	2.445E5 Y	2.71E-08	2.52E-08	4.69E-08	6.44E-08	2.47E-08	3.07E-08	3.00E-08	7.97E-08
U-235	7.038E8 Y	3.53E-05	3.44E-05	3.76E-05	5.45E-05	3.61E-05	3.00E-05	2.90E-05	5.59E-05
U-236	2.3415E7 Y	1.85E-08	1.80E-08	3.78E-08	5.09E-08	1.76E-08	2.38E-08	2.36E-08	6.51E-08
U-237	6.75 D	3.19E-05	3.07E-05	3.40E-05	5.27E-05	2.86E-05	2.65E-05	2.43E-05	5.41E-05
U-238	4.468E9 Y	1.58E-08	1.53E-08	3.28E-08	4.40E-08	1.50E-08	2.06E-08	2.04E-08	5.66E-08
U-239	23.40 M	1.14E-05	1.08E-05	1.19E-05	1.92E-05	8.47E-06	9.24E-06	7.76E-06	1.97E-05
U-240	14.1 H	1.80E-07	1.32E-07	2.48E-07	3.58E-07	9.77E-08	1.59E-07	1.39E-07	4.32E-07
NP-235	396.1 D	4.13E-07	4.06E-07	5.33E-07	8.22E-07	3.81E-07	3.88E-07	3.67E-07	9.01E-07
NP-236	1.15E6 Y	2.97E-05	2.91E-05	3.25E-05	5.13E-05	2.74E-05	2.52E-05	2.35E-05	5.30E-05
NP-236M	22.5 H	1.18E-05	1.14E-05	1.27E-05	1.94E-05	1.06E-05	1.01E-05	9.13E-06	2.00E-05
NP-237	2.14E6 Y	5.70E-06	5.18E-06	5.92E-06	9.71E-06	4.34E-06	4.48E-06	3.97E-06	1.01E-05
NP-238	2.117 D	1.27E-04	1.20E-04	1.28E-04	1.37E-04	1.30E-04	1.16E-04	1.04E-04	1.39E-04
NP-239	2.355 D	3.88E-05	3.77E-05	4.15E-05	6.08E-05	3.81E-05	3.33E-05	3.13E-05	6.25E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFF	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
TH-232	1.405E10 Y	1.31E-06	3.79E-08	3.87E-08	1.58E-07	4.85E-08	7.39E-08	2.91E-08	1.55E-07
TH-233	22.3 M	1.45E-05	7.43E-06	7.51E-06	1.15E-05	8.56E-06	1.06E-05	6.60E-06	9.09E-06
TH-234	24.10 D	4.78E-06	1.70E-06	1.72E-06	3.13E-06	2.30E-06	2.98E-06	1.47E-06	2.41E-06
PA-230	17.4 D	2.50E-04	1.42E-04	1.44E-04	2.11E-04	1.66E-04	2.00E-04	1.27E-04	1.69E-04
PA-231	3.276E4 Y	1.88E-05	6.72E-06	6.73E-06	1.10E-05	7.65E-06	9.77E-06	5.92E-06	8.77E-06
PA-233	27.0 D	8.85E-05	4.80E-05	4.79E-05	7.32E-05	5.49E-05	6.90E-05	4.26E-05	5.79E-05
PA-234	6.70 H	7.24E-04	4.20E-04	4.27E-04	6.17E-04	4.85E-04	5.85E-04	3.78E-04	4.95E-04
PA-234M	1.17 M	4.19E-06	2.44E-06	2.49E-06	3.57E-06	2.84E-06	3.41E-06	2.19E-06	2.87E-06
U-230	20.8 D	2.36E-06	2.40E-07	2.41E-07	5.52E-07	2.93E-07	3.96E-07	2.04E-07	4.77E-07
U-231	4.2 D	4.37E-05	1.50E-05	1.50E-05	2.67E-05	1.91E-05	2.50E-05	1.29E-05	2.08E-05
U-232	72 Y	2.00E-06	5.43E-08	5.50E-08	2.53E-07	6.33E-08	1.05E-07	3.98E-08	2.45E-07
U-233	1.592E5 Y	7.05E-07	5.07E-08	5.05E-08	1.32E-07	5.90E-08	8.39E-08	4.19E-08	1.19E-07
U-234	2.445E5 Y	1.72E-06	2.96E-08	3.01E-08	1.91E-07	3.19E-08	6.23E-08	1.90E-08	1.91E-07
U-235	7.038E8 Y	6.14E-05	3.42E-05	3.40E-05	5.24E-05	3.99E-05	5.07E-05	3.03E-05	4.13E-05
U-236	2.3415E7 Y	1.62E-06	2.23E-08	2.27E-08	1.70E-07	2.28E-08	4.90E-08	1.35E-08	1.73E-07
U-237	6.75 D	6.54E-05	2.99E-05	2.99E-05	5.01E-05	3.72E-05	4.79E-05	2.61E-05	3.89E-05
U-238	4.468E9 Y	1.43E-06	1.91E-08	1.95E-08	1.50E-07	1.95E-08	4.25E-08	1.13E-08	1.53E-07
U-239	23.40 M	2.17E-05	1.00E-05	1.03E-05	1.79E-05	1.37E-05	1.74E-05	8.83E-06	1.36E-05
U-240	14.1 H	7.64E-06	1.42E-07	1.52E-07	1.06E-06	1.90E-07	3.76E-07	8.27E-08	9.74E-07
NP-235	396.1 D	6.95E-06	4.25E-07	4.26E-07	1.27E-06	4.98E-07	7.43E-07	3.40E-07	1.14E-06
NP-236	1.15E6 Y	7.23E-05	2.88E-05	2.87E-05	4.81E-05	3.53E-05	4.57E-05	2.51E-05	3.79E-05
NP-236M	22.5 H	2.43E-05	1.12E-05	1.12E-05	1.84E-05	1.38E-05	1.77E-05	9.76E-06	1.44E-05
NP-237	2.14E6 Y	2.04E-05	5.00E-06	5.06E-06	1.00E-05	6.55E-06	8.78E-06	4.24E-06	7.80E-06
NP-238	2.117 D	2.02E-04	1.16E-04	1.19E-04	1.70E-04	1.36E-04	1.62E-04	1.05E-04	1.37E-04
NP-239	2.355 D	7.36E-05	3.73E-05	3.72E-05	5.91E-05	4.42E-05	5.65E-05	3.28E-05	4.64E-05

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
NP-240	65 M	2.69E-04	2.58E-04	2.88E-04	3.50E-04	2.54E-04	2.29E-04	2.70E-04	2.49E-04
NP-240M	7.4 M	7.66E-05	7.36E-05	8.23E-05	9.89E-05	7.23E-05	6.54E-05	7.68E-05	7.09E-05
PU-236	2.851 Y	4.20E-08	1.15E-08	1.47E-08	1.25E-06	1.53E-08	9.26E-09	1.04E-08	2.62E-08
PU-237	45.3 D	1.13E-05	1.08E-05	1.13E-05	2.53E-05	1.04E-05	8.95E-06	1.12E-05	1.01E-05
PU-238	87.75 Y	3.32E-08	5.72E-09	8.56E-09	1.10E-06	9.63E-09	4.66E-09	5.03E-09	1.95E-08
PU-239	24131 Y	2.41E-08	1.26E-08	1.46E-08	4.37E-07	1.42E-08	1.08E-08	1.32E-08	1.77E-08
PU-240	6537 Y	3.22E-08	6.20E-09	8.74E-09	1.05E-06	9.70E-09	4.95E-09	5.42E-09	1.91E-08
PU-241	14.4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PU-242	3.758E5 Y	2.70E-08	5.51E-09	7.68E-09	8.70E-07	8.42E-09	4.43E-09	4.86E-09	1.62E-08
PU-243	4.956 H	5.40E-06	5.41E-06	5.57E-06	1.14E-05	5.04E-06	4.43E-06	5.40E-06	4.85E-06
PU-244	8.26E7 Y	2.12E-08	2.48E-09	4.05E-09	7.51E-07	5.03E-09	1.87E-09	2.01E-09	1.20E-08
PU-245	10.57 H	9.97E-05	9.47E-05	1.05E-04	1.31E-04	9.29E-05	8.36E-05	9.87E-05	9.12E-05
PU-246	10.85 D	2.37E-05	2.26E-05	2.30E-05	3.82E-05	2.10E-05	1.89E-05	2.27E-05	2.10E-05
AM-241	432.2 Y	4.41E-06	4.94E-06	4.52E-06	1.50E-05	4.01E-06	3.70E-06	4.40E-06	3.93E-06
AM-242	16.02 H	3.28E-06	3.04E-06	3.20E-06	8.91E-06	2.96E-06	2.54E-06	3.18E-06	2.90E-06
AM-242M	152 Y	1.55E-07	6.22E-08	7.36E-08	3.20E-06	7.41E-08	5.16E-08	6.13E-08	1.07E-07
AM-243	7.38E3 Y	1.14E-05	1.21E-05	1.19E-05	2.80E-05	1.07E-05	9.55E-06	1.15E-05	1.03E-05
AM-244	10.1 H	1.88E-04	1.81E-04	2.03E-04	2.46E-04	1.78E-04	1.61E-04	1.89E-04	1.74E-04
AM-245	122.4 M	7.65E-06	7.07E-06	7.56E-06	1.28E-05	6.90E-06	6.07E-06	7.36E-06	6.80E-06
AM-246	25.0 M	2.19E-04	2.13E-04	2.40E-04	2.72E-04	2.11E-04	1.92E-04	2.24E-04	2.06E-04
CM-242	163.2 D	3.84E-08	5.27E-09	9.39E-09	1.16E-06	1.09E-08	4.73E-09	4.77E-09	2.29E-08
CM-243	28.5 Y	3.10E-05	2.87E-05	3.07E-05	5.35E-05	2.80E-05	2.46E-05	2.98E-05	2.76E-05
CM-244	18.11 Y	3.33E-08	3.63E-09	7.33E-09	1.04E-06	8.76E-09	3.38E-09	3.26E-09	1.96E-08
CM-245	8.5E3 Y	1.69E-05	1.58E-05	1.67E-05	3.48E-05	1.54E-05	1.33E-05	1.66E-05	1.51E-05
CM-246	4.75E3 Y	2.87E-08	2.49E-09	5.32E-09	9.22E-07	6.77E-09	2.20E-09	2.07E-09	1.66E-08

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
NP-240	65 M	2.69E-04	2.57E-04	2.75E-04	3.12E-04	2.77E-04	2.46E-04	2.21E-04	3.18E-04
NP-240M	7.4 M	7.67E-05	7.32E-05	7.84E-05	8.76E-05	7.[illegible]7E-05	7.04E-05	6.32E-05	8.91E-05
PU-236	2.851 Y	1.34E-08	1.31E-08	4.28E-08	5.21E-08	1.71E-08	2.53E-08	2.65E-08	7.25E-08
PU-237	45.3 D	1.10E-05	1.07E-05	1.20E-05	1.98E-05	9.[illegible]6E-06	9.21E-06	8.39E-06	2.04E-05
PU-238	87.75 Y	7.22E-09	7.12E-09	3.31E-08	3.75E-08	1.22E-08	1.88E-08	2.06E-08	5.54E-08
PU-239	24131 Y	1.31E-08	1.31E-08	2.42E-08	3.24E-08	1.31E-08	1.62E-08	1.66E-08	3.98E-08
PU-240	6537 Y	7.74E-09	7.48E-09	3.23E-08	3.71E-08	1.20E-08	1.85E-08	2.00E-08	5.42E-08
PU-241	14.4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PU-242	3.758E5 Y	6.75E-09	6.59E-09	2.72E-08	3.15E-08	1.[illegible]2E-08	1.56E-08	1.68E-08	4.57E-08
PU-243	4.956 H	5.55E-06	5.38E-06	5.96E-06	9.88E-06	4.[illegible]9E-06	4.57E-06	3.98E-06	1.02E-05
PU-244	8.26E7 Y	3.66E-09	3.24E-09	2.09E-08	2.24E-08	7.25E-09	1.16E-08	1.30E-08	3.45E-08
PU-245	10.57 H	9.84E-05	9.42E-05	1.01E-04	1.20E-04	1.[illegible]2E-04	8.92E-05	8.09E-05	1.22E-04
PU-246	10.85 D	2.37E-05	2.21E-05	2.41E-05	3.42E-05	2.27E-05	1.93E-05	1.82E-05	3.49E-05
AM-241	432.2 Y	5.34E-06	4.81E-06	5.43E-06	9.67E-06	2.[illegible]1E-06	3.95E-06	3.05E-06	9.98E-06
AM-242	16.02 H	3.10E-06	3.03E-06	3.46E-06	5.60E-06	2.76E-06	2.64E-06	2.44E-06	5.82E-06
AM-242M	152 Y	7.21E-08	6.83E-08	1.61E-07	2.13E-07	7.[illegible]5E-08	1.02E-07	1.02E-07	2.70E-07
AM-243	7.38E3 Y	1.25E-05	1.19E-05	1.32E-05	2.31E-05	8.[illegible]4E-06	9.86E-06	8.16E-06	2.38E-05
AM-244	10.1 H	1.89E-04	1.80E-04	1.93E-04	2.15E-04	1.[illegible]4E-04	1.74E-04	1.55E-04	2.19E-04
AM-245	122.4 M	7.24E-06	7.05E-06	7.75E-06	1.12E-05	7.23E-06	6.22E-06	5.89E-06	1.15E-05
AM-246	25.0 M	2.24E-04	2.12E-04	2.26E-04	2.43E-04	2.[illegible]E-04	2.05E-04	1.83E-04	2.47E-04
CM-242	163.2 D	7.51E-09	7.61E-09	3.88E-08	4.46E-08	1.[illegible]2E-08	2.21E-08	2.38E-08	6.45E-08
CM-243	28.5 Y	2.95E-05	2.86E-05	3.15E-05	4.57E-05	2.[illegible]3E-05	2.53E-05	2.39E-05	4.69E-05
CM-244	18.11 Y	5.59E-09	5.73E-09	3.34E-08	3.78E-08	1.20E-08	1.89E-08	2.06E-08	5.55E-08
CM-245	8.5E3 Y	1.61E-05	1.58E-05	1.76E-05	2.00E-05	1.[illegible]8E-05	1.36E-05	1.27E-05	2.89E-05
CM-246	4.75E3 Y	4.47E-09	4.14E-09	2.87E-08	3.17E-08	9.[illegible]1E-09	1.60E-08	1.76E-08	4.74E-08

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
NP-240	65 M	4.39E-04	2.50E-04	2.54E-04	3.69E-04	2.87E-04	3.48E-04	2.24E-04	2.96E-04
NP-240M	7.4 M	1.25E-04	7.12E-05	7.22E-05	1.05E-04	8.08E-05	9.79E-05	6.40E-05	8.42E-05
PU-236	2.851 Y	2.19E-06	2.14E-08	2.20E-08	2.38E-07	1.56E-08	5.44E-08	8.51E-09	2.39E-07
PU-237	45.3 D	2.74E-05	1.05E-05	1.05E-05	1.82E-05	1.33E-05	1.73E-05	9.08E-06	1.42E-05
PU-238	87.75 Y	1.94E-06	1.49E-08	1.53E-08	2.04E-07	7.89E-09	4.08E-08	3.98E-09	2.07E-07
PU-239	24131 Y	7.56E-07	1.63E-08	1.63E-08	9.36E-08	1.53E-08	3.15E-08	1.08E-08	9.12E-08
PU-240	6537 Y	1.85E-06	1.48E-08	1.52E-08	1.96E-07	8.52E-09	4.01E-08	4.26E-09	1.98E-07
PU-241	14.4 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PU-242	3.758E5 Y	1.53E-06	1.26E-08	1.30E-08	1.63E-07	7.55E-09	3.39E-08	3.88E-09	1.64E-07
PU-243	4.956 H	1.15E-05	5.12E-06	5.18E-06	8.98E-06	6.78E-06	8.69E-06	4.48E-06	6.88E-06
PU-244	8.26E7 Y	1.33E-06	8.69E-09	8.95E-09	1.37E-07	3.40E-09	2.54E-08	1.42E-09	1.40E-07
PU-245	10.57 H	1.58E-04	9.20E-05	9.30E-05	1.36E-04	1.05E-04	1.29E-04	8.23E-05	1.09E-04
PU-246	10.85 D	3.94E-05	2.16E-05	2.16E-05	3.48E-05	2.60E-05	3.30E-05	1.90E-05	2.69E-05
AM-241	432.2 Y	1.73E-05	4.25E-06	4.42E-06	9.57E-06	6.57E-06	8.58E-06	3.59E-06	7.18E-06
AM-242	16.02 H	1.07E-05	3.02E-06	3.01E-06	5.52E-06	3.72E-06	4.94E-06	2.58E-06	4.38E-06
AM-242M	152 Y	5.34E-06	9.45E-08	9.70E-08	7.41E-07	7.98E-08	2.22E-07	4.85E-08	6.90E-07
AM-243	7.38E3 Y	2.86E-05	1.10E-05	1.12E-05	2.09E-05	1.57E-05	2.01E-05	9.59E-06	1.58E-05
AM-244	10.1 H	3.14E-04	1.75E-04	1.78E-04	2.58E-04	2.02E-04	2.44E-04	1.56E-04	2.08E-04
AM-245	122.4 M	1.36E-05	6.99E-06	6.96E-06	1.10E-05	8.20E-06	1.05E-05	6.16E-06	8.64E-06
AM-246	25.0 M	3.51E-04	2.05E-04	2.09E-04	2.99E-04	2.38E-04	2.84E-04	1.86E-04	2.41E-04
CM-242	163.2 D	1.99E-06	1.75E-08	1.81E-08	2.38E-07	7.49E-09	5.02E-08	3.79E-09	2.30E-07
CM-243	28.5 Y	5.81E-05	2.84E-05	2.83E-05	4.49E-05	3.34E-05	4.26E-05	2.49E-05	3.53E-05
CM-244	18.11 Y	1.77E-06	1.46E-08	1.52E-08	2.10E-07	5.27E-09	4.30E-08	2.54E-09	2.04E-07
CM-245	8.5E3 Y	3.74E-05	1.56E-05	1.56E-05	2.61E-05	1.91E-05	2.49E-05	1.36E-05	2.05E-05
CM-246	4.75E3 Y	1.58E-06	1.21E-08	1.26E-08	1.86E-07	3.64E-09	3.70E-08	1.42E-09	1.81E-07

Microfilmed From Best Available Copy

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	ADRENALS	BLADDER	BRAIN	BREAST	HEART	SMALL INTESTINE	UPPER LARGE INTESTINE	LOWER LARGE INTESTINE
CM-247	1.56E7 Y	7.79E-05	7.28E-05	8.02E-05	1.02E-04	7.10E-05	6.38E-05	7.53E-05	7.00E-05
CM-248	3.39E5 Y	2.41E-08	3.29E-09	5.80E-09	7.32E-07	6.73E-09	2.91E-09	2.93E-09	1.43E-08
CM-249	64.15 M	4.51E-06	4.29E-06	4.79E-06	5.70E-06	4.21E-06	3.79E-06	4.47E-06	4.12E-06
CM-250	6.9E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-249	320 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-250	3.222 H	1.99E-04	1.94E-04	2.19E-04	2.46E-04	1.92E-04	1.75E-04	2.04E-04	1.88E-04
BK-251	57.0 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CF-248	333.5 D	2.79E-08	1.52E-09	4.90E-09	8.19E-07	6.44E-09	1.76E-09	1.31E-09	1.64E-08
CF-249	350.6 Y	8.10E-05	7.54E-05	8.29E-05	1.09E-04	7.36E-05	6.60E-05	7.80E-05	7.27E-05
CF-250	13.08 Y	3.19E-08	5.81E-09	9.67E-09	8.16E-07	1.07E-08	5.45E-09	5.68E-09	2.02E-08
CF-251	9.0E2 Y	2.84E-05	2.63E-05	2.80E-05	5.11E-05	2.57E-05	2.25E-05	2.74E-05	2.52E-05
CF-252	2.639 Y	2.86E-08	4.32E-09	7.78E-09	7.59E-07	8.83E-09	4.13E-09	4.10E-09	1.77E-08
CF-253	17.81 D	4.71E-10	2.03E-11	8.48E-11	1.38E-08	1.10E-10	2.92E-11	1.98E-11	2.77E-10
CF-254	60.5 D	3.03E-12	4.26E-12	2.68E-12	1.08E-11	2.43E-12	2.59E-12	3.35E-12	2.65E-12
ES-253	20.467 D	9.03E-08	6.75E-08	7.44E-08	5.82E-07	6.92E-08	5.92E-08	6.97E-08	7.49E-08
ES-254	275.7 D	9.86E-07	6.40E-07	6.97E-07	1.14E-05	6.52E-07	5.35E-07	6.21E-07	7.72E-07
ES-254M	39.3 H	1.33E-04	1.27E-04	1.43E-04	1.68E-04	1.25E-04	1.13E-04	1.33E-04	1.22E-04
ES-255	39.8 D	2.14E-09	1.53E-10	4.02E-10	5.93E-08	5.18E-10	1.63E-10	1.30E-10	1.28E-09
FM-254	3.240 H	3.89E-08	9.54E-09	1.43E-08	8.30E-07	1.52E-08	8.88E-09	9.62E-09	2.59E-08
FM-255	20.07 H	5.93E-07	3.83E-07	4.12E-07	7.06E-06	3.89E-07	3.12E-07	3.70E-07	4.63E-07
FM-256	157.6 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	KIDNEYS	LIVER	LUNGS	MARROW	RED MARROW	OVARIES	PANCREAS	SKELETON
CM-247	1.56E7 Y	7.53E-05	7.24E-05	7.80E-05	9.45E-05	8.02E-05	6.80E-05	6.25E-05	9.61E-05
CM-248	3.39E5 Y	4.74E-09	4.73E-09	2.44E-08	2.80E-08	8.82E-09	1.39E-08	1.49E-08	4.06E-08
CM-249	64.15 M	4.46E-06	4.27E-06	4.58E-06	5.23E-06	4.66E-06	4.11E-06	3.67E-06	5.31E-06
CM-250	6.9E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-249	320 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-250	3.222 H	2.04E-04	1.93E-04	2.06E-04	2.20E-04	2.08E-04	1.87E-04	1.67E-04	2.23E-04
BK-251	57.0 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CF-248	333.5 D	4.15E-09	3.77E-09	2.83E-08	3.21E-08	9.66E-09	1.60E-08	1.71E-08	4.66E-08
CF-249	350.6 Y	7.79E-05	7.51E-05	8.10E-05	9.95E-05	8.31E-05	7.00E-05	6.47E-05	1.01E-04
CF-250	13.08 Y	8.24E-09	8.20E-09	3.29E-08	4.02E-08	1.30E-08	1.95E-08	2.01E-08	5.48E-08
CF-251	9.0E2 Y	2.68E-05	2.62E-05	2.90E-05	4.37E-05	2.62E-05	2.29E-05	2.17E-05	4.50E-05
CF-252	2.639 Y	6.63E-09	6.54E-09	2.95E-08	3.55E-08	1.11E-08	1.72E-08	1.79E-08	4.90E-08
CF-253	17.81 D	6.07E-11	6.16E-11	4.77E-10	5.38E-10	1.65E-10	2.69E-10	2.90E-10	7.85E-10
CF-254	60.5 D	5.26E-12	3.60E-12	3.98E-12	7.15E-12	1.73E-12	2.89E-12	1.98E-12	7.29E-12
ES-253	20.467 D	7.11E-08	6.89E-08	8.97E-08	1.20E-07	7.85E-08	6.82E-08	6.74E-08	1.31E-07
ES-254	275.7 D	7.07E-07	6.66E-07	1.05E-06	1.47E-06	6.72E-07	7.40E-07	6.90E-07	1.68E-06
ES-254M	39.3 H	1.33E-04	1.27E-04	1.36E-04	1.51E-04	1.38E-04	1.23E-04	1.09E-04	1.54E-04
ES-255	39.8 D	3.97E-10	3.34E-10	2.20E-09	2.56E-09	7.53E-10	1.26E-09	1.31E-09	3.63E-09
FM-254	3.240 H	1.36E-08	1.28E-08	4.09E-08	5.28E-08	1.75E-08	2.51E-08	2.49E-08	6.82E-08
FM-255	20.07 H	4.31E-07	4.03E-07	6.53E-07	9.89E-07	3.57E-07	4.46E-07	4.03E-07	1.12E-06
FM-256	157.6 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PHOTON DOSE-RATE CONVERSION FACTORS FOR VARIOUS ORGANS FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	SKIN	SPLEEN	STOMACH	TESTES	THYMUS	THYROID	UTERUS	TOTAL BODY
CM-247	1.56E7 Y	1.20E-04	7.12E-05	7.15E-05	1.05E-04	7.93E-05	9.80E-05	6.36E-05	8.38E-05
CM-248	3.39E5 Y	1.25E-06	1.09E-08	1.13E-08	1.50E-07	4.68E-09	3.16E-08	2.29E-09	1.45E-07
CM-249	64.15 M	7.09E-06	4.16E-06	4.22E-06	6.14E-06	4.71E-06	5.74E-06	3.72E-06	4.90E-06
CM-250	6.9E3 Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-249	320 D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BK-250	3.222 H	3.19E-04	1.87E-04	1.91E-04	2.72E-04	2.18E-04	2.59E-04	1.69E-04	2.19E-04
BK-251	57.0 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CF-248	333.5 D	1.36E-06	1.20E-08	1.27E-08	1.82E-07	2.53E-09	3.86E-08	7.79E-10	1.69E-07
CF-249	350.6 Y	1.29E-04	7.39E-05	7.41E-05	1.10E-04	8.25E-05	1.02E-04	6.60E-05	8.75E-05
CF-250	13.08 Y	1.35E-06	1.61E-08	1.68E-08	1.86E-07	8.06E-09	4.52E-08	4.59E-09	1.72E-07
CF-251	9.0E2 Y	5.38E-05	2.61E-05	2.59E-05	4.17E-05	3.10E-05	3.99E-05	2.28E-05	3.28E-05
CF-252	2.639 Y	1.26E-06	1.39E-08	1.46E-08	1.72E-07	6.19E-09	4.04E-08	3.27E-09	1.59E-07
CF-253	17.81 D	2.31E-08	2.03E-10	2.13E-10	3.06E-09	3.63E-11	6.45E-10	1.34E-11	2.86E-09
CF-254	60.5 D	1.07E-11	2.88E-12	3.13E-12	8.27E-12	5.53E-12	7.19E-12	2.37E-12	5.65E-12
ES-253	20.467 D	8.93E-07	7.37E-08	7.36E-08	2.09E-07	7.70E-08	1.20E-07	5.94E-08	1.79E-07
ES-254	275.7 D	1.80E-05	7.41E-07	7.58E-07	3.37E-06	7.86E-07	1.48E-06	5.20E-07	2.93E-06
ES-254M	39.3 H	2.15E-04	1.23E-04	1.25E-04	1.82E-04	1.40E-04	1.70E-04	1.10E-04	1.46E-04
ES-255	39.8 D	9.76E-08	9.53E-10	1.01E-09	1.38E-08	2.46E-10	3.10E-09	7.67E-11	1.26E-08
FM-254	3.240 H	1.33E-06	2.17E-08	2.27E-08	2.11E-07	1.30E-08	5.91E-08	7.60E-09	1.87E-07
FM-255	20.07 H	1.09E-05	4.48E-07	4.62E-07	2.16E-06	4.97E-07	9.69E-07	3.01E-07	1.84E-06
FM-256	157.6 M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
H-3	12.28 Y	0.0	0.0	0.0	0.0	0.0
BE-7	53.44 D	0.0	0.0	0.0	0.0	0.0
BE-10	1.6E6 Y	4.38E-05	2.50E-08	0.0	1.10E-05	3.77E-05
C-11	20.48 M	9.70E-04	1.96E-04	2.26E-05	2.96E-04	9.26E-04
C-14	5.73E3 Y	0.0	0.0	0.0	0.0	0.0
N-13	9.97 M	1.64E-03	5.64E-04	1.56E-04	6.76E-04	1.59E-03
N-16	7.13 S	5.74E-03	4.55E-03	3.73E-03	4.61E-03	5.69E-03
O-15	122.24 S	2.84E-03	1.52E-03	7.86E-04	1.62E-03	2.78E-03
F-18	109.74 M	1.48E-04	1.60E-06	0.0	3.78E-05	1.34E-04
NA-22	2.602 Y	4.17E-05	1.81E-06	1.28E-06	8.38E-06	3.60E-05
NA-24	15.00 H	1.99E-03	8.45E-04	3.23E-04	9.49E-04	1.94E-03
MG-27	9.458 M	2.67E-03	1.41E-03	7.19E-04	1.50E-03	2.61E-03
MG-28	20.91 H	3.76E-06	1.68E-07	8.40E-09	7.39E-07	3.07E-06
AL-26	7.2E5 Y	1.32E-03	4.39E-04	1.15E-04	5.32E-04	1.28E-03
AL-28	2.240 M	4.22E-03	2.93E-03	2.08E-03	3.00E-03	4.16E-03
SI-31	157.3 M	2.20E-03	1.01E-03	4.32E-04	1.11E-03	2.14E-03
SI-32	3.3E2 Y	0.0	0.0	0.0	0.0	0.0
P-32	14.29 D	2.64E-03	1.39E-03	7.04E-04	1.48E-03	2.58E-03
P-33	25.4 D	0.0	0.0	0.0	0.0	0.0
S-35	87.44 D	0.0	0.0	0.0	0.0	0.0
CL-36	3.01E5 Y	2.43E-04	9.65E-06	1.72E-08	4.69E-05	2.23E-04
CL-38	37.21 M	3.98E-03	2.86E-03	2.22E-03	2.94E-03	3.93E-03
AR-37	35.02 D	0.0	0.0	0.0	0.0	0.0
AR-39	269 Y	7.89E-05	9.77E-08	0.0	1.98E-05	6.89E-05
AR-41	1.827 H	1.49E-03	5.15E-04	1.50E-04	6.17E-04	1.45E-03
K-40	1.277E9 Y	1.57E-03	6.13E-04	2.09E-04	7.04E-04	1.52E-03
K-42	12.36 H	4.41E-03	3.16E-03	2.36E-03	3.24E-03	4.36E-03
K-43	22.6 H	5.52E-04	9.12E-05	1.95E-05	1.56E-04	5.22E-04
CA-41	1.03E5 Y	0.0	0.0	0.0	0.0	0.0
CA-45	162.7 D	0.0	0.0	0.0	0.0	0.0
CA-47	4.536 D	7.25E-04	3.30E-04	1.89E-04	3.72E-04	7.01E-04
CA-49	8.719 M	3.22E-03	1.96E-03	1.21E-03	2.04E-03	3.17E-03
SC-44	3.927 H	2.27E-03	1.05E-03	4.46E-04	1.15E-03	2.22E-03
SC-46	83.80 D	7.66E-08	3.48E-08	1.46E-08	3.84E-08	7.47E-08
SC-46M	18.72 S	0.0	0.0	0.0	0.0	0.0
SC-47	3.422 D	2.52E-05	1.04E-07	0.0	6.35E-06	2.22E-05
SC-48	43.67 H	1.35E-04	2.34E-06	1.02E-10	2.40E-05	1.22E-04
SC-49	57.4 M	3.11E-03	1.82E-03	1.07E-03	1.91E-03	3.05E-03
TI-44	47.3 Y	0.0	0.0	0.0	0.0	0.0
TI-45	3.08 H	1.10E-03	2.81E-04	4.85E-05	3.78E-04	1.05E-03
TI-51	5.752 M	3.23E-03	1.95E-03	1.18E-03	2.03E-03	3.18E-03
V-48	15.971 D	1.55E-04	5.36E-06	4.08E-09	2.94E-05	1.42E-04
V-49	330 D	0.0	0.0	0.0	0.0	0.0
V-52	3.75 M	3.80E-03	2.52E-03	1.70E-03	2.59E-03	3.75E-03
CR-49	42.09 M	2.26E-03	1.06E-03	4.60E-04	1.16E-03	2.21E-03
CR-51	27.704 D	0.0	0.0	0.0	0.0	0.0
MN-52	5.591 D	2.44E-05	3.93E-08	0.0	6.13E-06	2.14E-05
MN-52M	21.4 M	4.00E-03	2.71E-03	1.87E-03	2.78E-03	3.94E-03
MN-53	3.7E6 Y	0.0	0.0	0.0	0.0	0.0

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
MN-54	312.7 D	0.0	0.0	0.0	0.0	0.0
MN-56	2.5785 H	2.66E-03	1.68E-03	1.15E-03	1.76E-03	2.61E-03
MN-57	1.47 M	3.87E-03	2.58E-03	1.77E-03	2.66E-03	3.81E-03
FE-52	8.275 H	3.37E-04	3.28E-05	7.80E-07	7.82E-05	3.17E-04
FE-55	2.7 Y	0.0	0.0	0.0	0.0	0.0
FE-59	44.63 D	5.78E-06	1.98E-06	9.02E-07	2.43E-06	5.30E-06
CO-56	78.76 D	4.50E-04	2.06E-04	8.60E-05	2.27E-04	4.39E-04
CO-57	270.9 D	0.0	0.0	0.0	0.0	0.0
CO-58	70.80 D	1.22E-06	0.0	0.0	2.32E-07	9.47E-07
CO-58M	9.15 H	0.0	0.0	0.0	0.0	0.0
CO-60	5.271 Y	0.0	0.0	0.0	0.0	0.0
CO-60M	10.47 M	5.19E-06	2.46E-06	1.11E-06	2.69E-06	5.06E-06
CO-61	1.650 H	1.51E-03	5.50E-04	1.69E-04	6.47E-04	1.47E-03
NI-56	6.10 D	0.0	0.0	0.0	0.0	0.0
NI-57	36.08 H	2.62E-04	3.09E-05	1.27E-06	6.44E-05	2.47E-04
NI-59	7.5E4 Y	0.0	0.0	0.0	0.0	0.0
NI-63	100.1 Y	0.0	0.0	0.0	0.0	0.0
NI-65	2.520 H	2.12E-03	1.23E-03	7.41E-04	1.30E-03	2.08E-03
CU-61	3.408 H	1.03E-03	3.54E-04	1.00E-04	4.24E-04	9.94E-04
CU-62	9.74 M	4.33E-03	3.04E-03	2.19E-03	3.11E-03	4.28E-03
CU-64	12.701 H	5.88E-05	6.91E-07	1.27E-11	1.03E-05	5.27E-05
CU-67	61.88 D	1.11E-05	1.51E-08	0.0	2.78E-06	9.58E-06
ZN-62	9.26 H	9.99E-06	5.16E-08	0.0	2.52E-06	8.88E-06
ZN-65	244.4 D	0.0	0.0	0.0	0.0	0.0
ZN-69	55.6 M	6.58E-04	1.06E-04	8.13E-06	1.82E-04	6.25E-04
ZN-69M	13.76 H	2.47E-05	0.0	0.0	3.18E-06	2.04E-05
GA-66	9.40 H	2.66E-03	2.00E-03	1.58E-03	2.04E-03	2.63E-03
GA-67	3.261 D	0.0	0.0	0.0	0.0	0.0
GA-68	68.0 M	2.85E-03	1.64E-03	9.25E-04	1.72E-03	2.80E-03
GA-72	14.1 H	1.38E-03	7.40E-04	4.59E-04	8.00E-04	1.35E-03
GE-68	288 D	0.0	0.0	0.0	0.0	0.0
GE-71	11.8 D	0.0	0.0	0.0	0.0	0.0
GE-77	11.30 H	2.24E-03	1.24E-03	7.08E-04	1.32E-03	2.20E-03
AS-72	26.0 H	3.62E-03	2.42E-03	1.66E-03	2.49E-03	3.57E-03
AS-73	80.30 D	0.0	0.0	0.0	0.0	0.0
AS-74	17.77 D	7.65E-04	2.59E-04	8.94E-05	3.15E-04	7.38E-04
AS-76	26.32 H	3.63E-03	2.43E-03	1.68E-03	2.51E-03	3.58E-03
AS-77	38.8 H	1.85E-04	5.58E-06	2.42E-09	3.45E-05	1.69E-04
SE-73	7.15 H	1.35E-03	5.29E-04	1.78E-04	6.07E-04	1.31E-03
SE-75	119.78 D	0.0	0.0	0.0	0.0	0.0
SE-79	6.5E4 Y	0.0	0.0	0.0	0.0	0.0
BR-77	57.04 H	0.0	0.0	0.0	0.0	0.0
BR-80	17.4 M	2.71E-03	1.56E-03	8.95E-04	1.64E-03	2.66E-03
BR-80M	4.42 H	0.0	0.0	0.0	0.0	0.0
BR-82	35.30 H	1.13E-06	2.97E-12	0.0	2.81E-07	8.19E-07
BR-83	2.39 H	6.69E-04	1.14E-04	9.70E-06	1.89E-04	6.36E-04
BR-84	31.80 M	3.56E-03	2.49E-03	1.85E-03	2.56E-03	3.51E-03
BR-85	172 S	3.59E-03	2.34E-03	1.55E-03	2.42E-03	3.54E-03
KR-79	35.04 H	1.00E-05	5.98E-08	0.0	2.53E-06	8.92E-06

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
KR-81	2.1E5 Y	0.0	0.0	0.0	0.0	0.0
KR-83M	1.83 H	0.0	0.0	0.0	0.0	0.0
KR-85	10.72 Y	2.78E-04	9.54E-06	4.[illegible]3E-09	5.27E-05	2.56E-04
KR-85M	4.48 H	3.85E-04	4.53E-05	1.[illegible]0E-06	9.47E-05	3.63E-04
KR-87	76.3 M	4.04E-03	2.86E-03	2.[illegible]2E-03	2.93E-03	3.99E-03
KR-88	2.84 H	7.85E-04	5.06E-04	3.[illegible]2E-04	5.27E-04	7.71E-04
KR-89	3.16 M	4.04E-03	2.86E-03	2.[illegible]2E-03	2.93E-03	3.99E-03
KR-90	32.32 S	4.13E-03	2.90E-03	2.[illegible]0E-03	2.97E-03	4.08E-03
RB-81	4.58 H	4.41E-04	1.16E-04	2.[illegible]8E-05	1.54E-04	4.24E-04
RB-82	1.25 M	4.48E-03	3.24E-03	2.[illegible]1E-03	3.31E-03	4.43E-03
RB-83	86.2 D	0.0	0.0	0.0	0.0	0.0
RB-84	32.9 D	5.11E-04	2.32E-04	1.[illegible]7E-04	2.59E-04	4.97E-04
RB-86	18.66 D	2.48E-03	1.38E-03	7.[illegible]2E-04	1.46E-03	2.43E-03
RB-87	4.73E10 Y	0.0	0.0	0.0	0.0	0.0
RB-88	17.8 M	5.15E-03	3.97E-03	3.[illegible]9E-03	4.04E-03	5.10E-03
RB-89	15.44 M	3.20E-03	2.04E-03	1.[illegible]9E-03	2.12E-03	3.15E-03
RB-90	157 S	4.80E-03	3.61E-03	2.[illegible]4E-03	3.68E-03	4.75E-03
RB-90M	258 S	4.06E-03	2.87E-03	2.[illegible]2E-03	2.94E-03	4.01E-03
SR-82	25.0 D	0.0	0.0	0.0	0.0	0.0
SR-85	64.84 D	9.73E-06	0.0	0.0	2.26E-06	8.99E-06
SR-85M	67.66 M	0.0	0.0	0.0	0.0	0.0
SR-87M	2.805 H	4.33E-06	0.0	0.0	1.69E-06	2.53E-06
SR-89	50.55 D	2.18E-03	1.06E-03	4.[illegible]7E-04	1.16E-03	2.13E-03
SR-90	28.6 Y	5.07E-05	2.16E-08	0.0	1.27E-05	4.36E-05
SR-91	9.5 H	2.16E-03	1.18E-03	6.[illegible]9E-04	1.26E-03	2.12E-03
SR-92	2.71 H	1.49E-04	7.01E-05	4.[illegible]0E-05	7.84E-05	1.42E-04
SR-93	7.3 M	3.13E-03	1.90E-03	1.[illegible]9E-03	1.99E-03	3.08E-03
Y-86	14.74 H	7.95E-04	3.90E-04	1.[illegible]3E-04	4.26E-04	7.76E-04
Y-87	80.3 H	2.55E-06	0.0	0.0	4.58E-07	2.28E-06
Y-88	106.60 D	1.47E-06	1.15E-07	1.[illegible]9E-09	3.22E-07	1.38E-06
Y-90	64.1 H	3.41E-03	2.18E-03	1.[illegible]3E-03	2.26E-03	3.36E-03
Y-90M	3.19 H	8.88E-05	0.0	0.0	1.76E-05	7.91E-05
Y-91	58.51 D	2.27E-03	1.14E-03	5.[illegible]6E-04	1.23E-03	2.22E-03
Y-91M	49.71 M	1.06E-04	1.89E-06	0.0	2.70E-05	1.00E-04
Y-92	3.54 H	4.38E-03	3.17E-03	2.[illegible]9E-03	3.24E-03	4.33E-03
Y-93	10.1 H	3.94E-03	2.72E-03	1.[illegible]4E-03	2.79E-03	3.89E-03
ZR-86	16.5 H	0.0	0.0	0.0	0.0	0.0
ZR-88	83.4 D	9.25E-07	0.0	0.0	4.84E-08	5.67E-07
ZR-89	78.43 H	2.51E-04	5.49E-05	1.[illegible]0E-05	8.01E-05	2.40E-04
ZR-93	1.53E6 Y	0.0	0.0	0.0	0.0	0.0
ZR-95	64.02 D	7.21E-06	1.39E-06	1.[illegible]6E-07	2.15E-06	6.87E-06
ZR-97	16.90 H	2.57E-03	1.43E-03	7.[illegible]2E-04	1.51E-03	2.52E-03
NB-90	14.60 H	1.36E-03	6.42E-04	2.[illegible]9E-04	7.01E-04	1.33E-03
NB-91	1E4 Y	0.0	0.0	0.0	0.0	0.0
NB-91M	61 D	0.0	0.0	0.0	0.0	0.0
NB-92	3.6E7 Y	5.62E-06	9.82E-08	0.0	1.43E-06	5.33E-06
NB-92M	10.15 D	0.0	0.0	0.0	0.0	0.0
NB-93M	14.6 Y	0.0	0.0	0.0	0.0	0.0
NB-94	2.03E4 Y	8.81E-06	1.63E-06	3.[illegible]1E-08	2.56E-06	7.89E-06

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
NB-94M	6.26 M	6.61E-06	2.26E-06	6.39E-07	2.71E-06	6.40E-06
NB-95	35.06 D	4.81E-06	2.02E-06	2.16E-07	2.19E-06	4.72E-06
NB-95M	86.6 H	7.98E-05	2.79E-05	7.69E-06	3.32E-05	7.73E-05
NB-96	23.35 H	2.90E-04	1.88E-05	3.81E-07	6.10E-05	2.70E-04
NB-97	72.1 M	1.54E-03	5.67E-04	1.79E-04	6.64E-04	1.49E-03
NB-97M	60 S	6.92E-05	2.74E-05	1.99E-06	3.01E-05	6.78E-05
MO-91	15.49 M	4.53E-03	3.32E-03	2.50E-03	3.38E-03	4.48E-03
MO-93	3.5E3 Y	0.0	0.0	0.0	0.0	0.0
MO-99	66.02 H	1.16E-03	3.96E-04	1.11E-04	4.76E-04	1.13E-03
MO-101	14.61 M	1.56E-03	7.89E-04	4.49E-04	8.61E-04	1.52E-03
TC-95	20.0 H	4.33E-06	1.87E-06	2.00E-07	2.00E-06	4.25E-06
TC-95M	61 D	1.64E-06	8.33E-08	2.13E-10	3.28E-07	1.52E-06
TC-96	4.28 D	4.52E-06	2.04E-06	2.69E-07	2.16E-06	4.44E-06
TC-96M	51.5 M	0.0	0.0	0.0	0.0	0.0
TC-97	2.6E6 Y	0.0	0.0	0.0	0.0	0.0
TC-97M	89 D	0.0	0.0	0.0	0.0	0.0
TC-98	4.2E6 Y	1.21E-05	3.34E-06	1.44E-07	4.26E-06	1.18E-05
TC-99	2.13E5 Y	0.0	0.0	0.0	0.0	0.0
TC-99M	6.02 H	0.0	0.0	0.0	0.0	0.0
TC-101	14.2 M	1.54E-03	5.88E-04	1.97E-04	6.82E-04	1.50E-03
RU-97	2.9 D	0.0	0.0	0.0	0.0	0.0
RU-103	39.35 D	1.30E-05	3.76E-07	1.12E-09	2.42E-06	1.19E-05
RU-105	4.44 H	1.17E-03	3.64E-04	9.16E-05	4.52E-04	1.13E-03
RU-106	368.2 D	0.0	0.0	0.0	0.0	0.0
RH-103M	56.119 M	0.0	0.0	0.0	0.0	0.0
RH-105	35.36 H	2.98E-05	3.43E-08	0.0	7.47E-06	2.59E-05
RH-105M	45 S	0.0	0.0	0.0	0.0	0.0
RH-106	29.92 S	4.45E-03	3.19E-03	2.37E-03	3.27E-03	4.39E-03
PD-103	16.961 D	0.0	0.0	0.0	0.0	0.0
PD-107	6.5E6 Y	0.0	0.0	0.0	0.0	0.0
PD-109	13.453 H	9.20E-04	2.19E-04	3.50E-05	3.05E-04	8.82E-04
AG-106M	8.46 D	5.93E-06	0.0	0.0	1.26E-06	5.40E-06
AG-108	2.37 M	2.26E-03	1.13E-03	5.42E-04	1.22E-03	2.21E-03
AG-108M	127 Y	1.45E-05	2.62E-06	6.63E-08	4.17E-06	1.37E-05
AG-109M	39.6 S	0.0	0.0	0.0	0.0	0.0
AG-110	24.57 S	4.03E-03	2.77E-03	1.95E-03	2.84E-03	3.97E-03
AG-110M	249.85 D	1.35E-05	1.41E-06	0.0	4.03E-06	1.24E-05
AG-111	7.46 D	8.61E-04	2.02E-04	3.21E-05	2.83E-04	8.25E-04
CD-109	464 D	0.0	0.0	0.0	0.0	0.0
CD-111M	48.7 M	0.0	0.0	0.0	0.0	0.0
CD-113	9.3E15 Y	0.0	0.0	0.0	0.0	0.0
CD-113M	13.7 Y	5.32E-05	1.35E-07	0.0	1.34E-05	4.67E-05
CD-115	53.46 H	7.02E-04	1.94E-04	4.18E-05	2.53E-04	6.74E-04
CD-115M	44.6 D	2.23E-03	1.10E-03	5.18E-04	1.19E-03	2.18E-03
CD-117	2.49 H	1.24E-03	6.96E-04	4.06E-04	7.39E-04	1.22E-03
CD-117M	3.36 H	1.94E-04	5.53E-05	2.54E-05	7.35E-05	1.84E-04
IN-111	2.83 D	0.0	0.0	0.0	0.0	0.0
IN-113M	1.658 H	6.54E-06	0.0	0.0	3.32E-07	3.19E-06
IN-114	71.9 S	2.90E-03	1.67E-03	9.59E-04	1.75E-03	2.84E-03

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
IN-114M	49.51 D	0.0	0.0	0.0	0.0	0.0
IN-115	4.6E15 Y	7.48E-06	0.0	0.0	1.69E-06	6.01E-06
IN-115M	4.36 H	1.84E-05	2.40E-06	1.21E-07	4.68E-06	1.74E-05
IN-116M	54.15 M	6.23E-04	1.24E-04	1.60E-05	1.89E-04	5.93E-04
IN-117	43.8 M	2.77E-04	1.57E-05	2.34E-07	5.67E-05	2.57E-04
IN-117M	116.5 M	1.29E-03	6.69E-04	3.37E-04	7.18E-04	1.26E-03
SN-113	115.1 D	0.0	0.0	0.0	0.0	0.0
SN-117M	13.60 D	0.0	0.0	0.0	0.0	0.0
SN-119M	293.0 D	0.0	0.0	0.0	0.0	0.0
SN-123	129.2 D	1.92E-03	8.69E-04	3.59E-04	9.59E-04	1.87E-03
SN-125	9.64 D	2.88E-03	1.84E-03	1.21E-03	1.91E-03	2.84E-03
SN-126	1.0E5 Y	0.0	0.0	0.0	0.0	0.0
SB-117	2.80 H	1.48E-06	1.57E-09	0.0	3.72E-07	1.29E-06
SB-122	2.70 D	2.00E-03	9.72E-04	4.71E-04	1.06E-03	1.95E-03
SB-124	60.20 D	9.98E-04	5.52E-04	3.32E-04	5.90E-04	9.75E-04
SB-125	2.77 Y	1.99E-05	1.81E-07	0.0	5.04E-06	1.78E-05
SB-126	12.4 D	7.38E-04	3.33E-04	1.64E-04	3.72E-04	7.18E-04
SB-126M	19.0 M	2.18E-03	1.16E-03	6.06E-04	1.24E-03	2.13E-03
SB-127	3.85 D	6.61E-04	1.50E-04	3.11E-05	2.15E-04	6.32E-04
SB-129	4.40 H	9.25E-04	4.42E-04	2.23E-04	4.86E-04	9.00E-04
TE-121	16.8 D	9.43E-06	1.35E-07	0.0	2.40E-06	8.80E-06
TE-121M	154 D	0.0	0.0	0.0	0.0	0.0
TE-123	1E13 Y	0.0	0.0	0.0	0.0	0.0
TE-123M	119.7 D	0.0	0.0	0.0	0.0	0.0
TE-125M	58 D	0.0	0.0	0.0	0.0	0.0
TE-127	9.35 H	1.78E-04	5.59E-06	3.20E-09	3.34E-05	1.63E-04
TE-127M	109 D	6.23E-06	3.42E-07	1.24E-09	1.27E-06	5.79E-06
TE-129	69.6 M	1.83E-03	7.96E-04	3.23E-04	8.90E-04	1.78E-03
TE-129M	33.6 D	7.83E-04	3.95E-04	1.95E-04	4.26E-04	7.66E-04
TE-131	25.0 M	2.52E-03	1.40E-03	7.86E-04	1.48E-03	2.47E-03
TE-131M	30 H	1.59E-04	9.25E-05	5.99E-05	9.82E-05	1.56E-04
TE-132	78.2 H	0.0	0.0	0.0	0.0	0.0
TE-133	12.45 M	2.91E-03	1.74E-03	1.07E-03	1.83E-03	2.86E-03
TE-133M	55.4 M	2.46E-03	1.42E-03	8.26E-04	1.49E-03	2.42E-03
TE-134	41.8 M	3.75E-06	2.25E-08	0.0	9.43E-07	3.27E-06
I-122	3.62 M	3.44E-03	2.43E-03	1.76E-03	2.49E-03	3.40E-03
I-123	13.13 H	0.0	0.0	0.0	0.0	0.0
I-124	4.18 D	7.49E-04	4.26E-04	2.44E-04	4.49E-04	7.35E-04
I-125	60.14 D	0.0	0.0	0.0	0.0	0.0
I-126	12.93 D	3.03E-04	8.13E-05	2.14E-05	1.08E-04	2.90E-04
I-128	24.99 M	2.82E-03	1.66E-03	9.81E-04	1.74E-03	2.77E-03
I-129	1.57E7 Y	0.0	0.0	0.0	0.0	0.0
I-130	12.36 H	5.37E-04	1.20E-04	1.97E-05	1.73E-04	5.12E-04
I-131	8.040 D	6.48E-05	5.54E-07	6.48E-09	1.12E-05	5.76E-05
I-132	2.30 H	1.55E-03	7.00E-04	3.33E-04	7.81E-04	1.51E-03
I-133	20.8 H	1.24E-03	4.21E-04	1.23E-04	5.07E-04	1.20E-03
I-134	52.6 M	2.19E-03	1.08E-03	5.40E-04	1.17E-03	2.11E-03
I-135	6.61 H	1.02E-03	3.72E-04	1.36E-04	4.40E-04	9.84E-04
I-136	83 S	5.28E-03	4.05E-03	3.23E-03	4.12E-03	5.23E-03

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ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
XE-122	20.1 H	0.0	0.0	0.0	0.0	0.0
XE-123	2.14 H	5.77E-04	2.71E-04	1.17E-04	2.97E-04	5.63E-04
XE-125	16.8 H	1.89E-07	1.75E-11	0.0	4.73E-08	1.57E-07
XE-127	36.406 D	0.0	0.0	0.0	0.0	0.0
XE-129M	8.89 D	0.0	0.0	0.0	0.0	0.0
XE-131M	11.84 D	0.0	0.0	0.0	0.0	0.0
XE-133	5.245 D	0.0	0.0	0.0	0.0	0.0
XE-133M	2.19 D	0.0	0.0	0.0	0.0	0.0
XE-135	9.11 H	5.90E-04	9.50E-05	7.49E-06	1.63E-04	5.60E-04
XE-135M	15.36 M	2.93E-04	3.54E-07	0.0	7.34E-05	2.71E-04
XE-137	3.83 M	4.99E-03	3.77E-03	2.95E-03	3.83E-03	4.94E-03
XE-138	14.13 M	1.95E-03	1.20E-03	7.85E-04	1.26E-03	1.91E-03
CS-126	1.64 M	4.05E-03	2.99E-03	2.28E-03	3.05E-03	4.01E-03
CS-129	32.06 H	9.11E-08	0.0	0.0	2.43E-09	5.34E-08
CS-131	9.688 D	0.0	0.0	0.0	0.0	0.0
CS-132	6.475 D	1.68E-05	2.60E-06	1.73E-08	4.54E-06	1.61E-05
CS-134	2.062 Y	1.12E-04	5.86E-06	4.91E-07	2.27E-05	1.03E-04
CS-134M	2.90 H	0.0	0.0	0.0	0.0	0.0
CS-135	2.3E6 Y	0.0	0.0	0.0	0.0	0.0
CS-136	13.16 D	1.75E-05	7.77E-06	2.64E-06	8.53E-06	1.69E-05
CS-137	30.17 Y	7.84E-05	2.14E-05	5.47E-06	2.83E-05	7.42E-05
CS-138	32.2 M	4.07E-03	2.82E-03	2.01E-03	2.89E-03	4.02E-03
CS-139	9.40 M	4.76E-03	3.54E-03	2.73E-03	3.61E-03	4.71E-03
BA-131	11.8 D	4.80E-06	0.0	0.0	7.95E-07	4.24E-06
BA-133	10.5 Y	0.0	0.0	0.0	0.0	0.0
BA-133M	38.9 H	0.0	0.0	0.0	0.0	0.0
BA-135M	28.7 H	0.0	0.0	0.0	0.0	0.0
BA-137M	2.552 M	2.98E-04	5.48E-05	7.46E-08	8.62E-05	2.89E-04
BA-139	83.1 M	3.29E-03	2.04E-03	1.28E-03	2.12E-03	3.24E-03
BA-140	12.789 D	5.60E-04	1.25E-04	1.80E-05	1.80E-04	5.36E-04
BA-141	18.27 M	2.99E-03	1.82E-03	1.15E-03	1.91E-03	2.94E-03
BA-142	10.70 M	1.35E-03	5.87E-04	2.85E-04	6.65E-04	1.32E-03
LA-140	40.22 H	1.83E-03	7.99E-04	3.36E-04	8.93E-04	1.78E-03
LA-141	3.94 H	3.42E-03	2.18E-03	1.42E-03	2.26E-03	3.37E-03
LA-142	95.4 M	2.85E-03	1.74E-03	1.12E-03	1.82E-03	2.80E-03
CE-139	137.66 D	0.0	0.0	0.0	0.0	0.0
CE-141	32.50 D	1.42E-05	2.65E-08	0.0	3.55E-06	1.23E-05
CE-143	33.0 H	1.21E-03	4.23E-04	1.35E-04	5.06E-04	1.17E-03
CE-144	284.3 D	0.0	0.0	0.0	0.0	0.0
PR-142	19.13 H	3.00E-03	1.85E-03	1.17E-03	1.93E-03	2.95E-03
PR-143	13.56 D	6.61E-04	1.18E-04	1.12E-05	1.91E-04	6.29E-04
PR-144	17.28 M	4.06E-03	2.81E-03	2.00E-03	2.88E-03	4.00E-03
PR-144M	7.2 M	0.0	0.0	0.0	0.0	0.0
ND-147	10.98 D	3.04E-04	2.79E-05	6.55E-07	6.94E-05	2.85E-04
ND-149	1.73 H	1.44E-03	5.53E-04	1.97E-04	6.41E-04	1.40E-03
PM-143	265 D	4.78E-06	1.63E-06	5.38E-08	1.89E-06	4.67E-06
PM-144	363 D	2.98E-05	3.99E-06	1.24E-08	7.62E-06	2.85E-05
PM-145	17.7 Y	0.0	0.0	0.0	0.0	0.0
PM-146	2020 D	1.28E-04	1.20E-05	2.61E-07	2.93E-05	1.19E-04

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
PM-147	2.6234 Y	0.0	0.0	0.0	0.0	0.0
PM-148	5.37 D	2.48E-03	1.46E-03	9.10E-04	1.54E-03	2.43E-03
PM-148M	41.3 D	8.20E-05	5.36E-06	2.66E-07	1.73E-05	7.63E-05
PM-149	53.08 H	9.55E-04	2.47E-04	4.62E-05	3.31E-04	9.17E-04
PM-151	28.40 H	5.39E-04	1.10E-04	1.90E-05	1.66E-04	5.13E-04
SM-147	1.069E11 Y	0.0	0.0	0.0	0.0	0.0
SM-151	90 Y	0.0	0.0	0.0	0.0	0.0
SM-153	46.7 H	1.93E-04	1.04E-05	1.73E-07	3.91E-05	1.78E-04
EU-152	13.6 Y	1.95E-04	7.40E-05	2.95E-05	8.67E-05	1.88E-04
EU-152M	9.32 H	1.80E-03	9.86E-04	5.33E-04	1.05E-03	1.77E-03
EU-154	8.8 Y	4.12E-04	1.76E-04	8.84E-05	2.01E-04	3.99E-04
EU-155	4.96 Y	0.0	0.0	0.0	0.0	0.0
EU-156	15.19 D	1.13E-03	6.68E-04	4.14E-04	7.02E-04	1.11E-03
GD-152	1.1E14 Y	0.0	0.0	0.0	0.0	0.0
GD-153	241.6 D	0.0	0.0	0.0	0.0	0.0
GD-159	18.56 H	6.54E-04	1.26E-04	1.45E-05	1.95E-04	6.23E-04
GD-162	9.7 M	7.04E-04	1.35E-04	1.49E-05	2.10E-04	6.71E-04
TB-157	150 Y	0.0	0.0	0.0	0.0	0.0
TB-160	72.3 D	2.88E-04	8.42E-05	3.44E-05	1.10E-04	2.75E-04
TB-162	7.76 M	1.65E-03	6.76E-04	2.51E-04	7.67E-04	1.60E-03
DY-157	8.06 H	0.0	0.0	0.0	0.0	0.0
DY-165	2.334 H	1.41E-03	5.09E-04	1.59E-04	6.00E-04	1.36E-03
DY-166	81.6 H	3.96E-07	0.0	0.0	8.17E-08	3.04E-07
HO-166	26.80 H	2.52E-03	1.38E-03	7.48E-04	1.47E-03	2.47E-03
HO-166M	1.20E3 Y	7.58E-05	2.61E-05	7.21E-06	3.12E-05	7.33E-05
ER-169	9.40 D	0.0	0.0	0.0	0.0	0.0
ER-171	7.52 H	9.34E-04	2.47E-04	4.97E-05	3.29E-04	8.97E-04
TM-170	128.6 D	6.68E-04	1.25E-04	1.36E-05	1.97E-04	6.36E-04
TM-171	1.92 Y	0.0	0.0	0.0	0.0	0.0
YB-169	31.97 D	0.0	0.0	0.0	0.0	0.0
YB-175	4.19 D	2.40E-06	0.0	0.0	4.29E-07	1.85E-06
LU-177	6.71 D	5.74E-06	0.0	0.0	1.31E-06	4.63E-06
LU-177M	160.10 D	2.73E-07	0.0	0.0	2.10E-08	2.01E-07
HF-181	42.39 D	9.58E-06	0.0	0.0	1.90E-06	8.08E-06
TA-182	114.74 D	1.23E-05	3.20E-06	1.92E-06	4.51E-06	1.11E-05
W-181	120.95 D	0.0	0.0	0.0	0.0	0.0
W-185	75.1 D	4.66E-07	0.0	0.0	5.53E-08	3.22E-07
W-187	23.83 H	4.76E-04	1.53E-04	4.99E-05	1.90E-04	4.57E-04
W-188	69.4 D	0.0	0.0	0.0	0.0	0.0
RE-182	64.0 H	0.0	0.0	0.0	0.0	0.0
RE-182M	12.7 H	5.65E-05	3.05E-05	1.58E-05	3.24E-05	5.54E-05
RE-183	70 D	0.0	0.0	0.0	0.0	0.0
RE-184	38.0 D	1.46E-05	6.75E-06	1.29E-06	7.14E-06	1.43E-05
RE-184M	169 D	0.0	0.0	0.0	0.0	0.0
RE-186	90.64 H	8.13E-04	2.01E-04	3.58E-05	2.75E-04	7.80E-04
RE-187	4.7E10 Y	0.0	0.0	0.0	0.0	0.0
RE-188	16.98 H	2.83E-03	1.65E-03	9.64E-04	1.73E-03	2.78E-03
OS-185	93.6 D	2.36E-05	2.02E-06	0.0	6.85E-06	2.27E-05
OS-186	2.0E15 Y	0.0	0.0	0.0	0.0	0.0

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ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
OS-190M	9.9 M	4.53E-05	1.15E-06	0.0	1.18E-05	4.18E-05
OS-191	15.4 D	0.0	0.0	0.0	0.0	0.0
OS-191M	13.03 H	0.0	0.0	0.0	0.0	0.0
OS-193	30.0 H	8.67E-04	2.32E-04	4.81E-05	3.08E-04	8.33E-04
IR-190	11.78 D	2.05E-05	7.80E-08	0.0	5.16E-06	1.89E-05
IR-190M	1.2 H	0.0	0.0	0.0	0.0	0.0
IR-190M	3.2 H	0.0	0.0	0.0	0.0	0.0
IR-192	74.02 D	8.17E-05	1.78E-06	1.47E-08	1.48E-05	7.37E-05
IR-193M	11.9 D	0.0	0.0	0.0	0.0	0.0
IR-194	19.15 H	2.96E-03	1.78E-03	1.09E-03	1.86E-03	2.91E-03
IR-194M	171 D	6.20E-05	3.67E-06	1.40E-08	1.28E-05	5.77E-05
PT-191	2.71 D	5.94E-06	0.0	0.0	1.01E-06	5.22E-06
PT-193	50 Y	0.0	0.0	0.0	0.0	0.0
PT-193M	4.33 D	0.0	0.0	0.0	0.0	0.0
PT-195M	4.02 D	0.0	0.0	0.0	0.0	0.0
PT-197	18.3 H	1.02E-04	1.89E-06	2.11E-09	1.82E-05	9.20E-05
PT-197M	94.4 M	6.12E-06	2.31E-07	3.91E-10	1.17E-06	5.62E-06
AU-194	39.5 H	3.95E-05	1.68E-05	6.52E-06	1.89E-05	3.84E-05
AU-195	183 D	0.0	0.0	0.0	0.0	0.0
AU-195M	30.6 S	0.0	0.0	0.0	0.0	0.0
AU-196	6.183 D	0.0	0.0	0.0	0.0	0.0
AU-198	2.696 D	6.66E-04	1.27E-04	1.41E-05	1.98E-04	6.34E-04
AU-199	3.139 D	1.77E-07	0.0	0.0	2.72E-08	1.31E-07
HG-197	64.14 H	0.0	0.0	0.0	0.0	0.0
HG-197M	23.8 H	0.0	0.0	0.0	0.0	0.0
HG-203	46.60 D	0.0	0.0	0.0	0.0	0.0
TL-200	26.1 H	2.89E-05	1.34E-05	6.00E-06	1.47E-05	2.81E-05
TL-201	73.06 H	0.0	0.0	0.0	0.0	0.0
TL-202	12.23 D	4.71E-06	0.0	0.0	5.87E-07	3.86E-06
TL-204	3.779 Y	3.80E-04	2.97E-05	3.41E-07	8.32E-05	3.56E-04
TL-207	4.77 M	1.69E-03	7.03E-04	2.69E-04	7.94E-04	1.64E-03
TL-208	3.053 M	2.03E-03	9.49E-04	4.47E-04	1.05E-03	1.98E-03
TL-209	2.20 M	2.47E-03	1.31E-03	6.90E-04	1.40E-03	2.42E-03
TL-210	1.30 M	2.42E-03	1.29E-03	6.93E-04	1.38E-03	2.37E-03
PB-203	52.02 H	0.0	0.0	0.0	0.0	0.0
PB-204M	66.9 M	3.72E-04	2.11E-04	7.08E-05	2.14E-04	3.66E-04
PB-205	1.51E7 Y	0.0	0.0	0.0	0.0	0.0
PB-209	3.253 H	9.97E-05	1.31E-06	0.0	2.56E-05	8.98E-05
PB-210	22.26 Y	0.0	0.0	0.0	0.0	0.0
PB-211	36.1 M	1.48E-03	5.88E-04	2.11E-04	6.74E-04	1.44E-03
PB-212	10.643 H	3.74E-06	4.98E-09	0.0	9.36E-07	3.25E-06
PB-214	26.8 M	2.04E-04	1.73E-05	1.80E-06	4.59E-05	1.89E-04
BI-206	6.243 D	1.46E-04	3.16E-05	5.81E-06	4.65E-05	1.37E-04
BI-207	33.4 Y	4.42E-04	2.71E-04	1.48E-04	2.79E-04	4.34E-04
BI-208	3.68E5 Y	9.93E-06	8.08E-06	6.81E-06	8.17E-06	9.85E-06
BI-210	5.013 D	1.11E-03	3.38E-04	8.23E-05	4.25E-04	1.07E-03
BI-211	2.13 M	1.14E-07	2.01E-10	0.0	2.85E-08	9.92E-08
BI-212	60.55 M	1.65E-03	9.68E-04	5.81E-04	1.02E-03	1.62E-03
BI-213	45.65 M	1.31E-03	4.93E-04	1.76E-04	5.76E-04	1.27E-03

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
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NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
BI-214	19.9 M	2.16E-03	1.14E-03	6.51E-04	1.23E-03	2.11E-03
PO-209	102 Y	0.0	0.0	0.0	0.0	0.0
PO-210	138.378 D	0.0	0.0	0.0	0.0	0.0
PO-211	0.516 S	0.0	0.0	0.0	0.0	0.0
PO-212	2.98E-7 S	0.0	0.0	0.0	0.0	0.0
PO-213	4.2E-6 S	0.0	0.0	0.0	0.0	0.0
PO-214	1.637E-4 S	0.0	0.0	0.0	0.0	0.0
PO-215	1.778E-3 S	0.0	0.0	0.0	0.0	0.0
PO-216	0.146 S	0.0	0.0	0.0	0.0	0.0
PO-218	3.05 M	0.0	0.0	0.0	0.0	0.0
AT-211	7.214 H	0.0	0.0	0.0	0.0	0.0
AT-217	0.0323 S	0.0	0.0	0.0	0.0	0.0
RN-218	0.035 S	0.0	0.0	0.0	0.0	0.0
RN-219	3.96 S	5.55E-08	0.0	0.0	2.20E-09	3.54E-08
RN-220	55.61 S	0.0	0.0	0.0	0.0	0.0
RN-222	3.8235 D	0.0	0.0	0.0	0.0	0.0
FR-221	4.8 M	0.0	0.0	0.0	0.0	0.0
FR-223	21.8 M	8.50E-04	2.14E-04	3.98E-05	2.91E-04	8.15E-04
RA-222	38.0 S	0.0	0.0	0.0	0.0	0.0
RA-223	11.434 D	0.0	0.0	0.0	0.0	0.0
RA-224	3.62 D	0.0	0.0	0.0	0.0	0.0
RA-225	14.8 D	3.28E-11	0.0	0.0	7.91E-14	0.0
RA-226	1600 Y	0.0	0.0	0.0	0.0	0.0
RA-228	5.75 Y	0.0	0.0	0.0	0.0	0.0
AC-225	10.0 D	0.0	0.0	0.0	0.0	0.0
AC-227	21.773 Y	0.0	0.0	0.0	0.0	0.0
AC-228	6.13 H	1.04E-03	4.22E-04	1.78E-04	4.85E-04	1.01E-03
TH-226	30.9 M	0.0	0.0	0.0	0.0	0.0
TH-227	18.718 D	0.0	0.0	0.0	0.0	0.0
TH-228	1.9132 Y	0.0	0.0	0.0	0.0	0.0
TH-229	7.34E3 Y	0.0	0.0	0.0	0.0	0.0
TH-230	7.7E4 Y	0.0	0.0	0.0	0.0	0.0
TH-231	25.52 H	0.0	0.0	0.0	0.0	0.0
TH-232	1.405E10 Y	0.0	0.0	0.0	0.0	0.0
TH-233	22.3 M	1.18E-03	3.91E-04	1.10E-04	4.76E-04	1.14E-03
TH-234	24.10 D	0.0	0.0	0.0	0.0	0.0
PA-230	17.4 D	7.32E-06	2.30E-08	0.0	1.84E-06	6.65E-06
PA-231	3.276E4 Y	0.0	0.0	0.0	0.0	0.0
PA-233	27.0 D	0.0	0.0	0.0	0.0	0.0
PA-234	6.70 H	3.81E-04	7.88E-05	1.97E-05	1.19E-04	3.60E-04
PA-234M	1.17 M	3.04E-03	1.83E-03	1.12E-03	1.91E-03	2.98E-03
U-230	20.8 D	0.0	0.0	0.0	0.0	0.0
U-231	4.2 D	0.0	0.0	0.0	0.0	0.0
U-232	72 Y	0.0	0.0	0.0	0.0	0.0
U-233	1.592E5 Y	0.0	0.0	0.0	0.0	0.0
U-234	2.445E5 Y	0.0	0.0	0.0	0.0	0.0
U-235	7.038E8 Y	0.0	0.0	0.0	0.0	0.0
U-236	2.3415E7 Y	0.0	0.0	0.0	0.0	0.0
U-237	6.75 D	0.0	0.0	0.0	0.0	0.0

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ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
U-238	4.468E9 Y	0.0	0.0	0.0	0.0	0.0
U-239	23.40 M	1.17E-03	3.80E-04	1.04E-04	4.65E-04	1.13E-03
U-240	14.1 H	5.36E-07	0.0	0.0	6.68E-08	3.75E-07
NP-235	396.1 D	0.0	0.0	0.0	0.0	0.0
NP-236	1.15E6 Y	0.0	0.0	0.0	0.0	0.0
NP-236M	22.5 H	1.06E-05	2.14E-08	0.0	2.65E-06	9.20E-06
NP-237	2.14E6 Y	0.0	0.0	0.0	0.0	0.0
NP-238	2.117 D	5.81E-04	2.02E-04	5.98E-05	2.42E-04	5.62E-04
NP-239	2.355 D	7.47E-06	2.81E-07	5.07E-10	1.43E-06	6.81E-06
NP-240	65 M	3.30E-04	2.48E-05	1.29E-06	7.17E-05	3.07E-04
NP-240M	7.4 M	2.11E-03	1.10E-03	5.83E-04	1.18E-03	2.06E-03
PU-236	2.851 Y	0.0	0.0	0.0	0.0	0.0
PU-237	45.3 D	0.0	0.0	0.0	0.0	0.0
PU-238	87.75 Y	0.0	0.0	0.0	0.0	0.0
PU-239	24131 Y	0.0	0.0	0.0	0.0	0.0
PU-240	6537 Y	0.0	0.0	0.0	0.0	0.0
PU-241	14.4 Y	0.0	0.0	0.0	0.0	0.0
PU-242	3.758E5 Y	0.0	0.0	0.0	0.0	0.0
PU-243	4.956 H	2.79E-05	5.06E-08	0.0	6.99E-06	2.42E-05
PU-244	8.26E7 Y	0.0	0.0	0.0	0.0	0.0
PU-245	10.57 H	4.63E-04	9.76E-05	1.65E-05	1.45E-04	4.42E-04
PU-246	10.85 D	0.0	0.0	0.0	0.0	0.0
AM-241	432.2 Y	0.0	0.0	0.0	0.0	0.0
AM-242	16.02 H	7.51E-05	1.02E-06	1.48E-11	1.32E-05	6.76E-05
AM-242M	152 Y	0.0	0.0	0.0	0.0	0.0
AM-243	7.38E3 Y	0.0	0.0	0.0	0.0	0.0
AM-244	10.1 H	1.82E-04	4.40E-05	3.10E-06	6.02E-05	1.77E-04
AM-245	122.4 M	4.03E-04	5.66E-05	3.87E-06	1.06E-04	3.80E-04
AM-246	25.0 M	1.31E-03	5.14E-04	2.02E-04	5.95E-04	1.27E-03
CM-242	163.2 D	0.0	0.0	0.0	0.0	0.0
CM-243	28.5 Y	0.0	0.0	0.0	0.0	0.0
CM-244	18.11 Y	0.0	0.0	0.0	0.0	0.0
CM-245	8.5E3 Y	0.0	0.0	0.0	0.0	0.0
CM-246	4.75E3 Y	0.0	0.0	0.0	0.0	0.0
CM-247	1.56E7 Y	8.60E-08	0.0	0.0	2.65E-09	5.22E-08
CM-248	3.39E5 Y	0.0	0.0	0.0	0.0	0.0
CM-249	64.15 M	4.67E-04	6.70E-05	4.39E-06	1.23E-04	4.42E-04
CM-250	6.9E3 Y	0.0	0.0	0.0	0.0	0.0
BK-249	320 D	0.0	0.0	0.0	0.0	0.0
BK-250	3.222 H	4.91E-04	1.67E-04	7.73E-05	2.06E-04	4.70E-04
BK-251	57.0 M	9.61E-04	2.67E-04	5.72E-05	3.48E-04	9.25E-04
CF-248	333.5 D	0.0	0.0	0.0	0.0	0.0
CF-249	350.6 Y	1.32E-08	0.0	0.0	7.15E-11	0.0
CF-250	13.08 Y	0.0	0.0	0.0	0.0	0.0
CF-251	9.0E2 Y	0.0	0.0	0.0	0.0	0.0
CF-252	2.639 Y	0.0	0.0	0.0	0.0	0.0
CF-253	17.81 D	0.0	0.0	0.0	0.0	0.0
CF-254	60.5 D	0.0	0.0	0.0	0.0	0.0
ES-253	20.467 D	0.0	0.0	0.0	0.0	0.0

ELECTRON DOSE-RATE CONVERSION FACTORS FOR SKIN FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE
IN SV/YR PER BQ/(SQUARE CM)

NUCLIDE	HALF-LIFE	FRONT OF DERMIS	MIDPOINT OF DERMIS	BACK OF DERMIS	AVERAGE OVER DERMIS	DEPTH OF 70 MICRONS
ES-254	275.7 D	0.0	0.0	0.0	0.0	0.0
ES-254M	39.3 H	1.98E-04	4.24E-05	7.68E-06	6.25E-05	1.89E-04
ES-255	39.8 D	0.0	0.0	0.0	0.0	0.0
FM-254	3.240 H	0.0	0.0	0.0	0.0	0.0
FM-255	20.07 H	0.0	0.0	0.0	0.0	0.0
FM-256	157.6 M	0.0	0.0	0.0	0.0	0.0

DOSE-RATE CONVERSION FACTORS FOR SKIN FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE IN SV/YR PER BQ/(SQUARE CM)

VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
H-3	12.28 Y	0.0	0.0	0.0
BE-7	53.44 D	1.86E-05	0.0	1.86E-05
BE-10	1.6E6 Y	0.0	3.77E-05	3.77E-05
C-11	20.48 M	3.80E-04	9.26E-04	1.31E-03
C-14	5.73E3 Y	0.0	0.0	0.0
N-13	9.97 M	3.80E-04	1.59E-03	1.97E-03
N-16	7.13 S	1.07E-03	5.69E-03	6.76E-03
O-15	122.24 S	3.81E-04	2.78E-03	3.16E-03
F-18	109.74 M	3.69E-04	1.34E-04	5.02E-04
NA-22	2.602 Y	7.59E-04	3.60E-05	7.95E-04
NA-24	15.00 H	1.25E-03	1.94E-03	3.19E-03
MG-27	9.458 M	3.24E-04	2.61E-03	2.93E-03
MG-28	20.91 H	4.70E-04	3.07E-06	4.73E-04
AL-26	7.2E5 Y	8.97E-04	1.28E-03	2.18E-03
AL-28	2.240 M	5.64E-04	4.16E-03	4.73E-03
SI-31	157.3 M	2.90E-07	2.14E-03	2.14E-03
SI-32	3.3E2 Y	0.0	0.0	0.0
P-32	14.29 D	0.0	2.58E-03	2.58E-03
P-33	25.4 D	0.0	0.0	0.0
S-35	87.44 D	0.0	0.0	0.0
CL-36	3.01E5 Y	1.51E-10	2.23E-04	2.23E-04
CL-38	37.21 M	4.70E-04	3.93E-03	4.40E-03
AR-37	35.02 D	2.56E-08	0.0	2.56E-08
AR-39	269 Y	0.0	6.89E-05	6.89E-05
AR-41	1.827 H	4.18E-04	1.45E-03	1.86E-03
K-40	1.277E9 Y	4.93E-05	1.52E-03	1.57E-03
K-42	12.36 H	8.70E-05	4.36E-03	4.45E-03
K-43	22.6 H	3.63E-04	5.22E-04	8.85E-04
CA-41	1.03E5 Y	6.70E-08	0.0	6.70E-08
CA-45	162.7 D	5.57E-13	0.0	5.57E-13
CA-47	4.536 D	3.50E-04	7.01E-04	1.05E-03
CA-49	8.719 M	8.85E-04	3.17E-03	4.05E-03
SC-44	3.927 H	7.55E-04	2.22E-03	2.97E-03
SC-46	83.80 D	7.07E-04	7.47E-08	7.07E-04
SC-46M	18.72 S	3.44E-05	0.0	3.44E-05
SC-47	3.422 D	4.14E-05	2.22E-05	6.36E-05
SC-48	43.67 H	1.15E-03	1.22E-04	1.27E-03
SC-49	57.4 M	3.30E-07	3.05E-03	3.05E-03
TI-44	47.3 Y	5.84E-05	0.0	5.84E-05
TI-45	3.08 H	3.25E-04	1.05E-03	1.38E-03
TI-51	5.752 M	1.38E-04	3.18E-03	3.31E-03
V-48	15.971 D	1.01E-03	1.42E-04	1.15E-03
V-49	330 D	2.45E-07	0.0	2.45E-07
V-52	3.75 M	4.59E-04	3.75E-03	4.21E-03
CR-49	42.09 M	3.93E-04	2.21E-03	2.60E-03
CR-51	27.704 D	1.22E-05	0.0	1.22E-05
MN-52	5.591 D	1.19E-03	2.14E-05	1.21E-03
MN-52M	21.4 M	8.20E-04	3.94E-03	4.76E-03
MN-53	3.7E6 Y	5.14E-07	0.0	5.14E-07

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VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
MN-54	312.7 D	3.08E-04	0.0	3.08E-04
MN-56	2.5785 H	5.78E-04	2.61E-03	3.19E-03
MN-57	1.47 M	2.87E-05	3.81E-03	3.84E-03
FE-52	8.275 H	2.76E-04	3.17E-04	5.92E-04
FE-55	2.7 Y	7.19E-07	0.0	7.19E-07
FE-59	44.63 D	3.99E-04	5.30E-06	4.04E-04
CO-56	78.76 D	1.19E-03	4.39E-04	1.63E-03
CO-57	270.9 D	4.99E-05	0.0	4.99E-05
CO-58	70.80 D	3.61E-04	9.47E-07	3.62E-04
CO-58M	9.15 H	1.15E-06	0.0	1.15E-06
CO-60	5.271 Y	8.24E-04	0.0	8.24E-04
CO-60M	10.47 M	2.80E-06	5.06E-06	7.86E-06
CO-61	1.650 H	3.67E-05	1.47E-03	1.50E-03
NI-56	6.10 D	6.28E-04	0.0	6.28E-04
NI-57	36.08 H	6.37E-04	2.47E-04	8.83E-04
NI-59	7.5E4 Y	1.35E-06	0.0	1.35E-06
NI-63	100.1 Y	0.0	0.0	0.0
NI-65	2.520 H	1.79E-04	2.08E-03	2.26E-03
CU-61	3.408 H	3.06E-04	9.94E-04	1.30E-03
CU-62	9.74 M	3.75E-04	4.28E-03	4.65E-03
CU-64	12.701 H	7.10E-05	5.27E-05	1.24E-04
CU-67	61.88 D	4.43E-05	9.58E-06	5.39E-05
ZN-62	9.26 H	1.73E-04	8.88E-06	1.82E-04
ZN-65	244.4 D	2.01E-04	0.0	2.01E-04
ZN-69	55.6 M	2.25E-09	6.25E-04	6.25E-04
ZN-69M	13.76 H	1.56E-04	2.04E-05	1.77E-04
GA-66	9.40 H	7.92E-04	2.63E-03	3.42E-03
GA-67	3.261 D	5.93E-05	0.0	5.93E-05
GA-68	68.0 M	3.53E-04	2.80E-03	3.15E-03
GA-72	14.1 H	9.12E-04	1.35E-03	2.26E-03
GE-68	288 D	3.73E-06	0.0	3.73E-06
GE-71	11.8 D	3.78E-06	0.0	3.78E-06
GE-77	11.30 H	3.86E-04	2.20E-03	2.58E-03
AS-72	26.0 H	6.54E-04	3.57E-03	4.22E-03
AS-73	80.30 D	1.27E-05	0.0	1.27E-05
AS-74	17.77 D	2.87E-04	7.38E-04	1.03E-03
AS-76	26.32 H	1.55E-04	3.58E-03	3.74E-03
AS-77	38.8 H	3.24E-06	1.69E-04	1.72E-04
SE-73	7.15 H	4.15E-04	1.31E-03	1.73E-03
SE-75	119.78 D	1.53E-04	0.0	1.53E-04
SE-79	6.5E4 Y	0.0	0.0	0.0
BR-77	57.04 H	1.24E-04	0.0	1.24E-04
BR-80	17.4 M	2.82E-05	2.66E-03	2.69E-03
BR-80M	4.42 H	1.77E-05	0.0	1.77E-05
BR-82	35.30 H	9.45E-04	8.19E-07	9.46E-04
BR-83	2.39 H	2.78E-06	6.36E-04	6.39E-04
BR-84	31.80 M	5.62E-04	3.51E-03	4.07E-03
BR-85	172 S	2.38E-05	3.54E-03	3.56E-03
KR-79	35.04 H	1.01E-04	8.92E-06	1.10E-04

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IN SV/YR PER BQ/(SQUARE CM)

VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
KR-81	2.1E5 Y	1.10E-05	0.0	1.10E-05
KR-83M	1.83 H	2.92E-06	0.0	2.92E-06
KR-85	10.72 Y	8.32E-07	2.56E-04	2.57E-04
KR-85M	4.48 H	6.09E-05	3.63E-04	4.24E-04
KR-87	76.3 M	2.62E-04	3.99E-03	4.25E-03
KR-88	2.84 H	6.25E-04	7.71E-04	1.40E-03
KR-89	3.16 M	5.93E-04	3.99E-03	4.58E-03
KR-90	32.32 S	4.32E-04	4.08E-03	4.51E-03
RB-81	4.58 H	2.35E-04	4.24E-04	6.59E-04
RB-82	1.25 M	4.08E-04	4.43E-03	4.84E-03
RB-83	86.2 D	1.95E-04	0.0	1.95E-04
RB-84	32.9 D	3.35E-04	4.97E-04	8.31E-04
RB-86	18.66 D	3.28E-05	2.43E-03	2.46E-03
RB-87	4.73E10 Y	0.0	0.0	0.0
RB-88	17.8 M	2.06E-04	5.10E-03	5.31E-03
RB-89	15.44 M	6.84E-04	3.15E-03	3.83E-03
RB-90	157 S	6.05E-04	4.75E-03	5.36E-03
RB-90M	258 S	1.03E-03	4.01E-03	5.04E-03
SR-82	25.0 D	9.53E-06	0.0	9.53E-06
SR-85	64.84 D	2.00E-04	8.99E-06	2.09E-04
SR-85M	67.66 M	8.28E-05	0.0	8.28E-05
SR-87M	2.805 H	1.22E-04	2.53E-06	1.24E-04
SR-89	50.55 D	4.96E-08	2.13E-03	2.13E-03
SR-90	28.6 Y	0.0	4.36E-05	4.36E-05
SR-91	9.5 H	2.47E-04	2.12E-03	2.36E-03
SR-92	2.71 H	4.32E-04	1.42E-04	5.74E-04
SR-93	7.3 M	7.77E-04	3.08E-03	3.86E-03
Y-86	14.74 H	1.25E-03	7.76E-04	2.02E-03
Y-87	80.3 H	1.81E-04	2.28E-06	1.83E-04
Y-88	106.60 D	9.02E-04	1.38E-06	9.04E-04
Y-90	64.1 H	0.0	3.36E-03	3.36E-03
Y-90M	3.19 H	2.39E-04	7.91E-05	3.18E-04
Y-91	58.51 D	1.20E-06	2.22E-03	2.22E-03
Y-91M	49.71 M	1.98E-04	1.00E-04	2.99E-04
Y-92	3.54 H	8.81E-05	4.33E-03	4.42E-03
Y-93	10.1 H	3.05E-05	3.89E-03	3.92E-03
ZR-86	16.5 H	1.24E-04	0.0	1.24E-04
ZR-88	83.4 D	1.55E-04	5.67E-07	1.55E-04
ZR-89	78.43 H	4.29E-04	2.40E-04	6.69E-04
ZR-93	1.53E6 Y	0.0	0.0	0.0
ZR-95	64.02 D	2.73E-04	6.87E-06	2.80E-04
ZR-97	16.90 H	6.28E-05	2.52E-03	2.58E-03
NB-90	14.60 H	1.37E-03	1.33E-03	2.70E-03
NB-91	1E4 Y	1.11E-05	0.0	1.11E-05
NB-91M	61 D	2.24E-05	0.0	2.24E-05
NB-92	3.6E7 Y	5.57E-04	5.33E-06	5.63E-04
NB-92M	10.15 D	3.57E-04	0.0	3.57E-04
NB-93M	14.6 Y	1.78E-06	0.0	1.78E-06
NB-94	2.03E4 Y	5.81E-04	7.89E-06	5.89E-04

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VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
NB-94M	6.26 M	8.31E-06	6.40E-06	1.47E-05
NB-95	35.06 D	2.84E-04	4.72E-06	2.88E-04
NB-95M	86.6 H	2.88E-05	7.73E-05	1.06E-04
NB-96	23.35 H	8.92E-04	2.70E-04	1.16E-03
NB-97	72.1 M	2.48E-04	1.49E-03	1.74E-03
NB-97M	60 S	2.71E-04	6.78E-05	3.39E-04
MO-91	15.49 M	3.64E-04	4.48E-03	4.84E-03
MO-93	3.5E3 Y	9.97E-06	0.0	9.97E-06
MO-99	66.02 H	5.80F-05	1.13E-03	1.18E-03
MO-101	14.61 M	5.14F-04	1.52E-03	2.04E-03
TC-95	20.0 H	3.00E-04	4.25E-06	3.04E-04
TC-95M	61 D	2.56E-04	1.52E-06	2.58E-04
TC-96	4.28 D	9.26E-04	4.44E-06	9.30E-04
TC-96M	51.5 M	2.01E-05	0.0	2.01E-05
TC-97	2.6E6 Y	1.02E-05	0.0	1.02E-05
TC-97M	89 D	7.74E-06	0.0	7.74E-06
TC-98	4.2E6 Y	5.19E-04	1.18E-05	5.31E-04
TC-99	2.13E5 Y	2.09E-10	0.0	2.09E-10
TC-99M	6.02 H	4.92E-05	0.0	4.92E-05
TC-101	14.2 M	1.29E-04	1.50E-03	1.63E-03
RU-97	2.9 D	9.66E-05	0.0	9.66E-05
RU-103	39.35 D	1.81E-04	1.19E-05	1.92E-04
RU-105	4.44 H	2.92E-04	1.13E-03	1.42E-03
RU-106	368.2 D	0.0	0.0	0.0
RH-103M	56.119 M	1.44E-06	0.0	1.44E-06
RH-105	35.36 H	2.93E-05	2.59E-05	5.52E-05
RH-105M	45 S	1.78E-05	0.0	1.78E-05
RH-106	29.92 S	7.62E-05	4.39E-03	4.47E-03
PD-103	16.961 D	1.28E-05	0.0	1.28E-05
PD-107	6.5E6 Y	0.0	0.0	0.0
PD-109	13.453 H	2.57E-07	8.82E-04	8.82E-04
AG-106M	8.46 D	1.01E-03	5.40E-06	1.01E-03
AG-108	2.37 M	6.76E-06	2.21E-03	2.22E-03
AG-108M	127 Y	6.11E-04	1.37E-05	6.24E-04
AG-109M	39.6 S	6.81E-06	0.0	6.81E-06
AG-110	24.57 S	1.14F-05	3.97E-03	3.99E-03
AG-110M	249.85 D	9.77E-04	1.24E-05	9.89E-04
AG-111	7.46 D	9.95E-06	8.25E-04	8.35E-04
CD-109	464 D	1.03E-05	0.0	1.03E-05
CD-111M	48.7 M	1.11E-04	0.0	1.11E-04
CD-113	9.3E15 Y	0.0	0.0	0.0
CD-113M	13.7 Y	0.0	4.67E-05	4.67E-05
CD-115	53.46 H	7.64E-05	6.74E-04	7.50E-04
CD-115M	44.6 D	7.66E-06	2.18E-03	2.19E-03
CD-117	2.49 H	3.70E-04	1.22E-03	1.59E-03
CD-117M	3.36 H	6.78E-04	1.84E-04	8.61E-04
IN-111	2.83 D	1.57E-04	0.0	1.57E-04
IN-113M	1.658 H	9.86E-05	3.19E-06	1.02E-04
IN-114	71.9 S	1.18E-05	2.84E-03	2.85E-03

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VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
IN-114M	49.51 D	3.77E-05	0.0	3.77E-05
IN-115	4.6E15 Y	0.0	6.01E-06	6.01E-06
IN-115M	4.36 H	6.35E-05	1.74E-05	8.09E-05
IN-116M	54.15 M	8.19E-04	5.93E-04	1.41E-03
IN-117	43.8 M	2.59E-04	2.57E-04	5.16E-04
IN-117M	116.5 M	3.54E-05	1.26E-03	1.30E-03
SN-113	115.1 D	1.10E-05	0.0	1.10E-05
SN-117M	13.60 D	6.13E-05	0.0	6.13E-05
SN-119M	293.0 D	5.47E-06	0.0	5.47E-06
SN-123	129.2 D	2.38E-06	1.87E-03	1.88E-03
SN-125	9.64 D	1.06E-04	2.84E-03	2.94E-03
SN-126	1.0E5 Y	2.38E-05	0.0	2.38E-05
SB-117	2.80 H	7.17E-05	1.29E-06	7.30E-05
SB-122	2.70 D	1.65E-04	1.95E-03	2.12E-03
SB-124	60.20 D	6.36E-04	9.75E-04	1.61E-03
SB-125	2.77 Y	1.63E-04	1.78E-05	1.80E-04
SB-126	12.4 D	1.02E-03	7.18E-04	1.74E-03
SB-126M	19.0 M	5.86E-04	2.13E-03	2.72E-03
SB-127	3.85 D	2.46E-04	6.32E-04	8.78E-04
SB-129	4.40 H	5.10E-04	9.00E-04	1.41E-03
TE-121	16.8 D	2.17E-04	8.88E-06	2.26E-04
TE-121M	154 D	8.19E-05	0.0	8.19E-05
TE-123	1E13 Y	5.66E-06	0.0	5.66E-06
TE-123M	119.7 D	5.72E-05	0.0	5.72E-05
TE-125M	58 D	1.51E-05	0.0	1.51E-05
TE-127	9.35 H	1.82E-06	1.63E-04	1.65E-04
TE-127M	109 D	4.83E-06	5.79E-06	1.06E-05
TE-129	69.6 M	2.14E-05	1.78E-03	1.81E-03
TE-129M	33.6 D	1.51E-05	7.66E-04	7.81E-04
TE-131	25.0 M	1.55E-04	2.47E-03	2.63E-03
TE-131M	30 H	5.13E-04	1.56E-04	6.69E-04
TE-132	78.2 H	8.95E-05	0.0	8.95E-05
TE-133	12.45 M	3.29E-04	2.86E-03	3.19E-03
TE-133M	55.4 M	7.96E-04	2.42E-03	3.21E-03
TE-134	41.8 M	3.28E-04	3.27E-06	3.31E-04
I-122	3.62 M	3.61E-04	3.40E-03	3.76E-03
I-123	13.13 H	6.71E-05	0.0	6.71E-05
I-124	4.18 D	3.77E-04	7.35E-04	1.11E-03
I-125	60.14 D	1.80E-05	0.0	1.80E-05
I-126	12.93 D	1.74E-04	2.90E-04	4.65E-04
I-128	24.99 M	2.84E-05	2.77E-03	2.80E-03
I-129	1.57E7 Y	1.43E-05	0.0	1.43E-05
I-130	12.36 H	7.92E-04	5.12E-04	1.30E-03
I-131	8.040 D	1.44E-04	5.76E-05	2.01E-04
I-132	2.30 H	8.33E-04	1.51E-03	2.35E-03
I-133	20.8 H	2.24E-04	1.20E-03	1.42E-03
I-134	52.6 M	9.40E-04	2.11E-03	3.05E-03
I-135	6.61 H	5.23E-04	9.84E-04	1.51E-03
I-136	83 S	7.91E-04	5.23E-03	6.02E-03

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NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
XE-122	20.1 H	3.12E-05	0.0	3.12E-05
XE-123	2.14 H	2.28E-04	5.63E-04	7.91E-04
XE-125	16.8 H	1.04E-04	1.57E-07	1.04E-04
XE-127	36.406 D	1.08E-04	0.0	1.08E-04
XE-129M	8.89 D	2.81E-05	0.0	2.81E-05
XE-131M	11.84 D	1.11E-05	0.0	1.11E-05
XE-133	5.245 D	2.15E-05	0.0	2.15E-05
XE-133M	2.19 D	1.93E-05	0.0	1.93E-05
XE-135	9.11 H	9.36E-05	5.60E-04	6.54E-04
XE-135M	15.36 M	1.62E-04	2.71E-04	4.33E-04
XE-137	3.83 M	6.78E-05	4.94E-03	5.01E-03
XE-138	14.13 M	3.74E-04	1.91E-03	2.29E-03
CS-126	1.64 M	4.19E-04	4.01E-03	4.42E-03
CS-129	32.06 H	1.14E-04	5.34E-08	1.14E-04
CS-131	9.688 D	1.34E-05	0.0	1.34E-05
CS-132	6.475 D	2.71E-04	1.61E-05	2.87E-04
CS-134	2.062 Y	5.75E-04	1.03E-04	6.78E-04
CS-134M	2.90 H	1.26E-05	0.0	1.26E-05
CS-135	2.3E6 Y	0.0	0.0	0.0
CS-136	13.16 D	7.79E-04	1.69E-05	7.96E-04
CS-137	30.17 Y	0.0	7.42E-05	7.42E-05
CS-138	32.2 M	7.71E-04	4.02E-03	4.79E-03
CS-139	9.40 M	9.78E-05	4.71E-03	4.81E-03
BA-131	11.8 D	1.84E-04	4.24E-06	1.88E-04
BA-133	10.5 Y	1.57E-04	0.0	1.57E-04
BA-133M	38.9 H	2.87E-05	0.0	2.87E-05
BA-135M	28.7 H	2.60E-05	0.0	2.60E-05
BA-137M	2.552 M	2.23E-04	2.89E-04	5.13E-04
BA-139	83.1 M	1.32E-05	3.24E-03	3.26E-03
BA-140	12.789 D	7.29E-05	5.36E-04	6.09E-04
BA-141	18.27 M	3.18E-04	2.94E-03	3.26E-03
BA-142	10.70 M	3.20E-04	1.32E-03	1.64E-03
LA-140	40.22 H	7.67E-04	1.78E-03	2.55E-03
LA-141	3.94 H	1.37E-05	3.37E-03	3.38E-03
LA-142	95.4 M	8.64E-04	2.80E-03	3.66E-03
CE-139	137.66 D	6.45E-05	0.0	6.45E-05
CE-141	32.50 D	3.00E-05	1.23E-05	4.23E-05
CE-143	33.0 H	1.05E-04	1.17E-03	1.28E-03
CE-144	284.3 D	7.74E-06	0.0	7.74E-06
PR-142	19.13 H	1.84E-05	2.95E-03	2.97E-03
PR-143	13.56 D	3.31E-12	6.29E-04	6.29E-04
PR-144	17.28 M	1.07E-05	4.00E-03	4.01E-03
PR-144M	7.2 M	5.43E-06	0.0	5.43E-06
ND-147	10.98 D	5.51E-05	2.85E-04	3.40E-04
ND-149	1.73 H	1.45E-04	1.40E-03	1.54E-03
PM-143	265 D	1.19E-04	4.67E-06	1.24E-04
PM-144	363 D	5.82E-04	2.85E-05	6.11E-04
PM-145	17.7 Y	1.45E-05	0.0	1.45E-05
PM-146	2020 D	2.82E-04	1.19E-04	4.01E-04

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NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
PM-147	2.6234 Y	1.34E-09	0.0	1.34E-09
PM-148	5.37 D	1.94E-04	2.43E-03	2.63E-03
PM-148M	41.3 D	7.39E-04	7.63E-05	8.15E-04
PM-149	53.08 H	4.38E-06	9.17E-04	9.21E-04
PM-151	28.40 H	1.28E-04	5.13E-04	6.42E-04
SM-147	1.069E11 Y	0.0	0.0	0.0
SM-151	90 Y	7.77E-09	0.0	7.77E-09
SM-153	46.7 H	2.75E-05	1.78E-04	2.05E-04
EU-152	13.6 Y	4.06E-04	1.88E-04	5.94E-04
EU-152M	9.32 H	1.16E-04	1.77E-03	1.88E-03
EU-154	8.8 Y	4.39E-04	3.99E-04	8.38E-04
EU-155	4.96 Y	2.54E-05	0.0	2.54E-05
EU-156	15.19 D	4.52E-04	1.11E-03	1.56E-03
GD-152	1.1E14 Y	0.0	0.0	0.0
GD-153	241.6 D	5.02E-05	0.0	5.02E-05
GD-159	18.56 H	1.61E-05	6.23E-04	6.39E-04
GD-162	9.7 M	1.59E-04	6.71E-04	8.30E-04
TB-157	150 Y	2.42E-06	0.0	2.42E-06
TB-160	72.3 D	3.85E-04	2.75E-04	6.60E-04
TB-162	7.76 M	4.05E-04	1.60E-03	2.01E-03
DY-157	8.06 H	1.37E-04	0.0	1.37E-04
DY-165	2.334 H	1.01E-05	1.36E-03	1.37E-03
DY-166	81.6 H	1.78E-05	3.04E-07	1.81E-05
HO-166	26.80 H	1.07E-05	2.47E-03	2.49E-03
HO-166M	1.20E3 Y	5.95E-04	7.33E-05	6.69E-04
ER-169	9.40 D	1.06E-08	0.0	1.06E-08
ER-171	7.52 H	1.44E-04	8.97E-04	1.04E-03
TM-170	128.6 D	2.44E-06	6.36E-04	6.39E-04
TM-171	1.92 Y	3.23E-07	0.0	3.23E-07
YB-169	31.97 D	1.30E-04	0.0	1.30E-04
YB-175	4.19 D	1.51E-05	1.85E-06	1.69E-05
LU-177	6.71 D	1.37E-05	4.63E-06	1.83E-05
LU-177M	160.10 D	3.82E-04	2.01E-07	3.83E-04
HF-181	42.39 D	2.06E-04	8.08E-06	2.14E-04
TA-182	114.74 D	4.46E-04	1.11E-05	4.57E-04
W-181	120.95 D	1.86E-05	0.0	1.86E-05
W-185	75.1 D	1.02E-08	3.22E-07	3.32E-07
W-187	23.83 H	1.80E-04	4.57E-04	6.37E-04
W-188	69.4 D	6.73E-07	0.0	6.73E-07
RE-182	64.0 H	6.22E-04	0.0	6.22E-04
RE-182M	12.7 H	4.17E-04	5.54E-05	4.72E-04
RE-183	70 D	6.67E-05	0.0	6.67E-05
RE-184	38.0 D	3.33E-04	1.43E-05	3.47E-04
RE-184M	169 D	1.49E-04	0.0	1.49E-04
RE-186	90.64 H	8.48E-06	7.80E-04	7.88E-04
RE-187	4.7E10 Y	0.0	0.0	0.0
RE-188	16.98 H	2.18E-05	2.78E-03	2.81E-03
OS-185	93.6 D	2.67E-04	2.27E-05	2.90E-04
OS-186	2.0E15 Y	0.0	0.0	0.0

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NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
OS-190M	9.9 M	5.97E-04	4.18E-05	6.39E-04
OS-191	15.4 D	3.23E-05	0.0	3.23E-05
OS-191M	13.03 H	3.71E-06	0.0	3.71E-06
OS-193	30.0 H	2.65E-05	8.33E-04	8.59E-04
IR-190	11.78 D	5.27E-04	1.89E-05	5.46E-04
IR-190M	1.2 H	1.86E-06	0.0	1.86E-06
IR-190M	3.2 H	2.23E-05	0.0	2.23E-05
IR-192	74.02 D	3.08E-04	7.37E-05	3.82E-04
IR-193M	11.9 D	1.96E-06	0.0	1.96E-06
IR-194	19.15 H	3.34E-05	2.91E-03	2.94E-03
IR-194M	171 D	8.75E-04	5.77E-05	9.33E-04
PT-191	2.71 D	1.17E-04	5.22E-06	1.22E-04
PT-193	50 Y	1.81E-06	0.0	1.81E-06
PT-193M	4.33 D	6.68E-06	0.0	6.68E-06
PT-195M	4.02 D	3.52E-05	0.0	3.52E-05
PT-197	18.3 H	1.11E-05	9.20E-05	1.03E-04
PT-197M	94.4 M	3.58E-05	5.62E-06	4.15E-05
AU-194	39.5 H	3.75E-04	3.84E-05	4.13E-04
AU-195	183 D	3.88E-05	0.0	3.88E-05
AU-195M	30.6 S	7.85E-05	0.0	7.85E-05
AU-196	6.183 D	1.83E-04	0.0	1.83E-04
AU-198	2.696 D	1.52E-04	6.34E-04	7.86E-04
AU-199	3.139 D	3.53E-05	1.31E-07	3.54E-05
HG-197	64.14 H	3.21E-05	0.0	3.21E-05
HG-197M	23.8 H	3.98E-05	0.0	3.98E-05
HG-203	46.60 D	8.71E-05	0.0	8.71E-05
TL-200	26.1 H	4.67E-04	2.81E-05	4.95E-04
TL-201	73.06 H	4.08E-05	0.0	4.08E-05
TL-202	12.23 D	1.80E-04	3.86E-06	1.84E-04
TL-204	3.779 Y	5.18E-07	3.56E-04	3.56E-04
TL-207	4.77 M	7.91E-07	1.64E-03	1.64E-03
TL-208	3.053 M	1.06E-03	1.98E-03	3.04E-03
TL-209	2.20 M	7.03E-04	2.42E-03	3.12E-03
TL-210	1.30 M	9.47E-04	2.37E-03	3.32E-03
PB-203	52.02 H	1.20E-04	0.0	1.20E-04
PB-204M	66.9 M	7.64E-04	3.66E-04	1.13E-03
PB-205	1.51E7 Y	2.38E-06	0.0	2.38E-06
PB-209	3.253 H	0.0	8.98E-05	8.98E-05
PB-210	22.26 Y	3.71E-06	0.0	3.71E-06
PB-211	36.1 M	1.89E-05	1.44E-03	1.46E-03
PB-212	10.643 H	5.79E-05	3.25E-06	6.12E-05
PB-214	26.8 M	9.54E-05	1.89E-04	2.85E-04
BI-206	6.243 D	1.18E-03	1.37E-04	1.31E-03
BI-207	33.4 Y	5.52E-04	4.34E-04	9.87E-04
BI-208	3.68E5 Y	7.98E-04	9.85E-06	8.08E-04
BI-210	5.013 D	0.0	1.07E-03	1.07E-03
BI-211	2.13 M	1.80E-05	9.92E-08	1.81E-05
BI-212	60.55 M	6.54E-05	1.62E-03	1.68E-03
BI-213	45.65 M	5.23E-05	1.27E-03	1.32E-03

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NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
BI-214	19.9 M	5.07E-04	2.11E-03	2.62E-03
PO-209	102 Y	1.30E-06	0.0	1.30E-06
PO-210	138.378 D	3.15E-09	0.0	3.15E-09
PO-211	0.516 S	2.86E-06	0.0	2.86E-06
PO-212	2.98E-7 S	0.0	0.0	0.0
PO-213	4.2E-6 S	1.13E-08	0.0	1.13E-08
PO-214	1.637E-4 S	3.08E-08	0.0	3.08E-08
PO-215	1.778E-3 S	5.59E-08	0.0	5.59E-08
PO-216	0.146 S	5.36E-09	0.0	5.36E-09
PO-218	3.05 M	0.0	0.0	0.0
AT-211	7.214 H	1.76E-05	0.0	1.76E-05
AT-217	0.0323 S	8.88E-08	0.0	8.88E-08
RN-218	0.035 S	2.82E-07	0.0	2.82E-07
RN-219	3.96 S	2.17E-05	3.54E-08	2.17E-05
RN-220	55.61 S	1.95E-07	0.0	1.95E-07
RN-222	3.8235 D	1.45E-07	0.0	1.45E-07
FR-221	4.8 M	1.19E-05	0.0	1.19E-05
FR-223	21.8 M	2.62E-05	8.15E-04	8.41E-04
RA-222	38.0 S	3.48E-06	0.0	3.48E-06
RA-223	11.434 D	5.48E-05	0.0	5.48E-05
RA-224	3.62 D	3.82E-06	0.0	3.82E-06
RA-225	14.8 D	9.25E-06	0.0	9.25E-06
RA-226	1600 Y	2.64E-06	0.0	2.64E-06
RA-228	5.75 Y	2.17E-12	0.0	2.17E-12
AC-225	10.0 D	8.19E-06	0.0	8.19E-06
AC-227	21.773 Y	2.33E-07	0.0	2.33E-07
AC-228	6.13 H	3.35E-04	1.01E-03	1.35E-03
TH-226	30.9 M	4.05E-06	0.0	4.05E-06
TH-227	18.718 D	4.63E-05	0.0	4.63E-05
TH-228	1.9132 Y	2.16E-06	0.0	2.16E-06
TH-229	7.34E3 Y	4.58E-05	0.0	4.58E-05
TH-230	7.7E4 Y	1.40E-06	0.0	1.40E-06
TH-231	25.52 H	1.74E-05	0.0	1.74E-05
TH-232	1.405E10 Y	1.31E-06	0.0	1.31E-06
TH-233	22.3 M	1.45E-05	1.14E-03	1.16E-03
TH-234	24.10 D	4.78E-06	0.0	4.78E-06
PA-230	17.4 D	2.50E-04	6.65E-06	2.57E-04
PA-231	3.276E4 Y	1.88E-05	0.0	1.88E-05
PA-233	27.0 D	8.85E-05	0.0	8.85E-05
PA-234	6.70 H	7.24E-04	3.60E-04	1.08E-03
PA-234M	1.17 M	4.19E-06	2.98E-03	2.99E-03
U-230	20.8 D	2.36E-06	0.0	2.36E-06
U-231	4.2 D	4.37E-05	0.0	4.37E-05
U-232	72 Y	2.00E-06	0.0	2.00E-06
U-233	1.592E5 Y	7.05E-07	0.0	7.05E-07
U-234	2.445E5 Y	1.72E-06	0.0	1.72E-06
U-235	7.038E8 Y	6.14E-05	0.0	6.14E-05
U-236	2.3415E7 Y	1.62E-06	0.0	1.62E-06
U-237	6.75 D	6.54E-05	0.0	6.54E-05

DOSE-RATE CONVERSION FACTORS FOR SKIN FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE IN SV/YR PER BQ/(SQUARE CM)

VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
U-238	4.468E9 Y	1.43E-06	0.0	1.43E-06
U-239	23.40 M	2.17E-05	1.13E-03	1.15E-03
U-240	14.1 H	7.64E-06	3.75E-07	8.01E-06
NP-235	396.1 D	6.95E-06	0.0	6.95E-06
NP-236	1.15E6 Y	7.23E-05	0.0	7.23E-05
NP-236M	22.5 H	2.43E-05	9.20E-06	3.35E-05
NP-237	2.14E6 Y	2.04E-05	0.0	2.04E-05
NP-238	2.117 D	2.02E-04	5.62E-04	7.64E-04
NP-239	2.355 D	7.36E-05	6.81E-06	8.04E-05
NP-240	65 M	4.39E-04	3.07E-04	7.46E-04
NP-240M	7.4 M	1.25E-04	2.06E-03	2.19E-03
PU-236	2.851 Y	2.19E-06	0.0	2.19E-06
PU-237	45.3 D	2.74E-05	0.0	2.74E-05
PU-238	87.75 Y	1.94E-06	0.0	1.94E-06
PU-239	24131 Y	7.56E-07	0.0	7.56E-07
PU-240	6537 Y	1.85E-06	0.0	1.85E-06
PU-241	14.4 Y	0.0	0.0	0.0
PU-242	3.758E5 Y	1.53E-06	0.0	1.53E-06
PU-243	4.956 H	1.15E-05	2.42E-05	3.57E-05
PU-244	8.26E7 Y	1.33E-06	0.0	1.33E-06
PU-245	10.57 H	1.58E-04	4.42E-04	5.99E-04
PU-246	10.85 D	3.94E-05	0.0	3.94E-05
AM-241	432.2 Y	1.73E-05	0.0	1.73E-05
AM-242	16.02 H	1.07E-05	6.76E-05	7.83E-05
AM-242M	152 Y	5.34E-06	0.0	5.34E-06
AM-243	7.38E3 Y	2.86E-05	0.0	2.86E-05
AM-244	10.1 H	3.14E-04	1.77E-04	4.91E-04
AM-245	122.4 M	1.36E-05	3.80E-04	3.94E-04
AM-246	25.0 M	3.51E-04	1.27E-03	1.62E-03
CM-242	163.2 D	1.99E-06	0.0	1.99E-06
CM-243	28.5 Y	5.81E-05	0.0	5.81E-05
CM-244	18.11 Y	1.77E-06	0.0	1.77E-06
CM-245	8.5E3 Y	3.74E-05	0.0	3.74E-05
CM-246	4.75E3 Y	1.58E-06	0.0	1.58E-06
CM-247	1.56E7 Y	1.20E-04	5.22E-08	1.20E-04
CM-248	3.39E5 Y	1.25E-06	0.0	1.25E-06
CM-249	64.15 M	7.09E-06	4.42E-04	4.49E-04
CM-250	6.9E3 Y	0.0	0.0	0.0
BK-249	320 D	0.0	0.0	0.0
BK-250	3.222 H	3.19E-04	4.70E-04	7.89E-04
BK-251	57.0 M	0.0	9.25E-04	9.25E-04
CF-248	333.5 D	1.36E-06	0.0	1.36E-06
CF-249	350.6 Y	1.29E-04	0.0	1.29E-04
CF-250	13.08 Y	1.35E-06	0.0	1.35E-06
CF-251	9.0E2 Y	5.38E-05	0.0	5.38E-05
CF-252	2.639 Y	1.26E-06	0.0	1.26E-06
CF-253	17.81 D	2.31E-08	0.0	2.31E-08
CF-254	60.5 D	1.07E-11	0.0	1.07E-11
ES-253	20.467 D	8.93E-07	0.0	8.93E-07

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DOSE-RATE CONVERSION FACTORS FOR SKIN FOR EXPOSURE 1 M ABOVE CONTAMINATED GROUND SURFACE IN SV/YR PER BQ/(SQUARE CM)

VALUES FOR ELECTRONS CORRESPOND TO A DEPTH OF 70 MICRONS

NUCLIDE	HALF-LIFE	PHOTON	ELECTRON	TOTAL
ES-254	275.7 D	1.80E-05	0.0	1.80E-05
ES-254M	39.3 H	2.15E-04	1.89E-04	4.04E-04
ES-255	39.8 D	9.76E-08	0.0	9.76E-08
FM-254	3.240 H	1.33E-06	0.0	1.33E-06
FM-255	20.07 H	1.09E-05	0.0	1.09E-05
FM-256	157.6 M	0.0	0.0	0.0

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